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# Πληροφοριακό Δελτίο της Ελληνικής Αρχαιομετρικής Εταιρείας

**- Ιούλιος 2013 -**

*Πάντα εκκαλύπτων ο χρόνος εις το φως άγει.*

*(Σοφοκλής)*

# Newsletter of the Hellenic Society of Archaeometry

**- July 2013 -**

**Nr. 148**

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**ΣΥΝΕΔΡΙΑ - CONFERENCES/WORKSHOPS**  
**VITH INTERNATIONAL CONFERENCE ON**  
**MAMMOTHS AND THEIR RELATIVES,**  
**GREVENA AND SIATISTA, MAY 2014**

Dear Colleagues,

Next year, May 2014, the VI<sup>th</sup> International Conference on Mammoths and their Relatives will be held in Northern Greece in the towns of Grevena and Siatista.

As President of the Organizing Committee, it is my pleasure to invite you to attend this conference. It would be a great honour for me and my team to welcome you to the towns of Siatista and Grevena in Northern Greece and to take you afterwards to the beautiful Island of Tilos to meet the dwarf elephants.

Most necessary information we have put together on our website which is on line since this week: [www.mammothconference.com](http://www.mammothconference.com).

Please do not hesitate to contact me if you have any questions.

We are looking forward to seeing and meeting you in Northern Greece in May 2014.

Sincerely yours,

Evangelia Tsoukala

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**22<sup>ND</sup> RADIOCARBON CONFERENCE,**  
**DAKAR, SENEGAL, 13-17 APRIL 2015, CALL**  
**FOR SESSIONS**

Dear all,

The 22<sup>nd</sup> Radiocarbon Conference will be held in Dakar (Senegal), from **13 to 17 April 2015**.

We would like to take this opportunity to ask the <sup>14</sup>C community to propose session topics.

Besides the classical topics (calibration, archaeology, oceanography, paleo-climatology), we welcome ideas to create new thematic sessions.

Feel free to outline your proposal. Please send an email to [radiocarbon2015@ucad.edu.sn](mailto:radiocarbon2015@ucad.edu.sn) with a session title; 10-15 lines of text describing the session, 2-3 keywords, and potential conveners.

We will accept proposals until **July 31, 2013**.

The Radiocarbon 2015 committee will organize the scientific program based on your contributions.

All the very best,

The Radiocarbon 2015 committee

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## **AUTHENTICATION IN ART, THE HAGUE, THE NETHERLANDS, 7-9 MAY, 2014, CALL FOR PAPERS**

Authentication in Art invites submissions of proposals of 500–700 words (up to 3000 characters) for oral presentations, to be given at the conference in The Hague, The Netherlands, 7-9 May, 2014 (Please see: <http://www.authenticationinart.org/>). Due to the multitude of problems that have become ever more prominent around establishing authorship of paintings and authenticity, the identification of fakes, and the contextual and legal issues associated with this process, the conference Authentication in Art has been established.

Conference Language: The conference language is English.

### Topics:

Papers addressing any of the following topics regarding issues of authentication of paintings are especially welcome.

(NOTE: the conference will concentrate on these issues related to paintings specifically to focus the scope of the discussions – themes considering sculpture, works on paper, etc. will not be considered):

- Issues of connoisseurship in the authentication of paintings. Standards of connoisseurship. The current state of connoisseurship. Can connoisseurship be articulated in a consistent manner? Refining the role of connoisseurship in the 21st century.
- Challenges faced by historians publishing or cataloguing the work of an artist. The need for interdisciplinary studies. Minimum requirements for specific types of authentication work. The process of attribution and authentication.
- Issues of the technological and scientific studies in the authentication of paintings. Standards for the technological and scientific studies in the authentication of paintings. What is the current state of play? What necessary standards might be established to ensure sound practice and effective work in issues of authentication?
- The training of professionals involved in the authentication of paintings; what is the current state of play? What is needed / could be improved?
- Legal issues arising from the authentication of paintings. Authentication in the legal sphere. National and international problems involving authentication.
- Terminology problems in the language used in authentication (may involve issues of terminology over various languages and translation issues, but the main presentation should be in English).
- Changing historical attitudes / approaches, both scientific and connoisseurial, to the authentication of paintings.
- Fakes and forgeries – their implications for the art market. Trends in the production and detection of fakes. The future of investigation of fakes by new or renewed scientific techniques.
- Improved IT-technology for the protection of open sources against falsification.

### The process:

Please select one of the working groups, listed at the end of this call for papers, to submit your topic to for consideration. If you have a paper of a broader theme, you are welcome

to submit it as an unallocated paper; however, space for such unallocated papers is strictly limited.

#### Proposals:

Proposals should be submitted to [papers@authenticationinart.org](mailto:papers@authenticationinart.org) by Friday, 15th September, 2013. Please do *not* include any illustrations with your proposal submission. Authors will be informed whether their work has been selected for further consideration by 30th October, 2013. If selected, you will be invited to develop the proposal into a synopsis of 1,000–1,200 words, which will be required for printed conference abstracts by the 15th of December 2013. A publication of conference papers in the form of postprints is planned.

Papers presented at and published as a result of the AiA Congress will all undergo a peer review process. To this end, the AiA Working Groups are appointing a Committee of international experts who will make selections from the proposals received and selected authors will be invited to develop the proposal into a synopsis. Authors may then be requested to refine the synopses as necessary, and the final versions will be edited for publication by the Congress Editorial Committee. Please bear in mind that submissions of papers should not address topics that have been presented and/or published elsewhere before the date of the Congress in May 2014, or which are slated for publication at a later date. Should an author be invited to present a paper, the conference organizers will provide for travel and accommodation for speakers at the congress.

Please contact the conference organizers at [m.den.leeuw@authenticationinart.org](mailto:m.den.leeuw@authenticationinart.org) if you have any questions or wish to receive further information on the Congress.

#### Working groups:

##### *GROUP A. Common terminology and understanding*

▪ Goal: to establish common terminology for the basis of information exchange. Experts from different fields operate each according to their own specific backgrounds such that there is a need for a common language, a single terminology serving all disciplines. What are the basic principles / problems?

##### *GROUP B. Standards for scientific and technological research*

▪ Goal: to consider and prioritize the most important topics in the field today: history, problems, potentials in the art technological study of paintings and the use of scientific examination techniques for art technology and authentication study. Issues in the identification of fakes and in establishing material authenticity.

##### *GROUP C. Education and Training*

▪ Goal: to examine the functioning of educational programs within art history, conservation and various forms of science and forensics and their relationship to the practice of authentication of paintings. Do the extant institutions provide adequate training for professionals who wish to engage in work with authentication? Past, present and future issues/solutions.

##### *GROUP D. Cataloguing and Publishing*

▪ Goal: identify best practice in terms of Catalogue Raisonnés (CRs) and related forms of authentication. Issues of the practice and relationship of connoisseurship, provenance research, material investigations, etc. in formation of CRs and in publishing on authenticity issues. Standards and approaches for determining authenticity and establishing CRs.

##### *GROUP E. Art and Law*



- Goal: to consider and prioritize the most important topics in the art law field relating to authenticity of paintings today. To examine the current state of expertise and information exchange in the art law field and identify where this could be improved.

*GROUP F. History of authentication of paintings from c.1700 – c.1940*

- Goal: to consider the most significant past developments relating to the formation of current practice. What do they tell us and how can we learn from them?

*GROUP G. Connoisseurship and the issuing of opinions*

- Goal: to consider the present and future of connoisseurship and its role in establishing authenticity in paintings. Issues relating to authentication such as the provision of “expertises”, “certificates” and the like. Standards for authentication and attribution.

Please visit the site: <http://www.authenticationinart.org/call-for-papers/>

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ΥΠΟΥΡΓΕΙΟ ΠΑΙΔΕΙΑΣ & ΘΡΗΣΚΕΥΜΑΤΩΝ, ΠΟΛΙΤΙΣΜΟΥ & ΑΘΛΗΤΙΣΜΟΥ

**ΕΠΙΤΡΟΠΗ ΣΥΝΤΗΡΗΣΕΩΣ ΜΝΗΜΕΙΩΝ**  
**ΑΚΡΟΠΟΛΕΩΣ, ΥΠΗΡΕΣΙΑ ΣΥΝΤΗΡΗΣΗΣ**  
**ΜΝΗΜΕΙΩΝ ΑΚΡΟΠΟΛΗΣ, 6η ΔΙΕΘΝΗΣ**  
**ΣΥΝΑΝΤΗΣΗ ΓΙΑ ΤΗΝ ΑΠΟΚΑΤΑΣΤΑΣΗ, ΤΩΝ**  
**ΜΝΗΜΕΙΩΝ ΑΚΡΟΠΟΛΕΩΣ, Αθήνα, 4 - 5**  
**Οκτωβρίου 2013, Β΄ Εγκύκλιος**

Στο πλαίσιο των δραστηριοτήτων της Επιτροπής Συντηρήσεως Μνημείων Ακρόπολεως και της Υπηρεσίας Συντήρησης Μνημείων Ακρόπολης και σε συνεργασία με την Α΄ Εφορεία Προϊστορικών και Κλασικών Αρχαιοτήτων, θα πραγματοποιηθεί στην Αθήνα στις 4 - 5 Οκτωβρίου 2013 η έκτη διεθνής διήμερη επιστημονική συνάντησης με θέμα: «**Τα αναστηλωτικά έργα στην Ακρόπολη**»

Θεματικοί άξονες του συμποσίου είναι αφ' ενός ο θεωρητικός προβληματισμός για την αποκατάσταση των μνημείων της Ακρόπολης και τα πορίσματα των πρόσφατων ερευνών στους τομείς της αρχιτεκτονικής και της συντήρησής τους και αφ' ετέρου ειδικότερα προβλήματα τεχνολογίας και εφαρμογών.

Η διοργάνωση θα έχει το χαρακτήρα διημερίδας, κατά την οποία θα παρουσιασθούν τα έργα που πραγματοποιήθηκαν στα μνημεία Ακρόπολεως κατά την περίοδο 2000-2010 με πιστώσεις του Γ΄ Κοινοτικού Πλαισίου Στήριξης, καθώς και τα έργα που βρίσκονται σε εξέλιξη και υλοποιούνται σύμφωνα με τις εγκεκριμένες από το Κεντρικό Αρχαιολογικό Συμβούλιο μελέτες, με πιστώσεις του Επιχειρησιακού προγράμματος «Αττική» (Εθνικό Στρατηγικό Πλαίσιο Αναφοράς 2007-2013) και τη συγχρηματοδότηση του Ευρωπαϊκού Ταμείου Περιφερειακής Ανάπτυξης και του Ελληνικού Δημοσίου.

Την Παρασκευή 4 Οκτωβρίου θα πραγματοποιηθεί το πρωί επίσκεψη στα μνημεία της Ακρόπολης κατά την οποία θα παρουσιασθούν από τους υπεύθυνους των εργοταξίων τόσο τα ολοκληρωμένα όσο και τα τρέχοντα αναστηλωτικά προγράμματα. Στην απογευματινή συνεδρία θα παρουσιασθεί το αναστηλωτικό έργο που ολοκληρώθηκε κατά τα έτη 2000 – 2010 καθώς και αυτό της περιόδου 2011 μέχρι σήμερα. Το Σάββατο 5.10.2013 στην πρωινή συνεδρία θα παρουσιασθούν ειδικά θέματα προς συζήτηση και σχολιασμό που θέτουν προβληματισμό ως προς τις επιστημονικές επιλογές των επεμβάσεων στα μνημεία καθώς και νέα μελλοντικά αναστηλωτικά προγράμματα. Το απόγευμα της ίδιας ημέρας θα συζητηθούν σε στρογγυλή τράπεζα οι απόψεις των συνέδρων για συγκεκριμένα ζητήματα αναστήλωσης των μνημείων και θα διατυπωθούν τα συμπεράσματα.

Αν και οι τελικές αποφάσεις επί των μελλοντικών έργων λαμβάνονται από το Κεντρικό Αρχαιολογικό Συμβούλιο και το Ελληνικό Υπουργείο, η Επιτροπή θεωρεί ότι οι απόψεις των συνέδρων επί των ζητημάτων που θα τεθούν θα είναι επιστημονικά επωφελείς για την πορεία των έργων. Για το λόγο αυτό θα συνταχθεί συγκεκριμένο ερωτηματολόγιο που θα διανεμηθεί στους συνέδρους.

Οι εργασίες του συνεδρίου θα δημοσιευθούν στα πρακτικά, η έκδοση των οποίων θα ακολουθήσει.

Παρακαλούμε, να δηλώσετε τη συμμετοχή σας στο Γραφείο Γραμματείας και στο Γραφείο Τεκμηρίωσης της ΥΣΜΑ, τηλ. 210.32.43.427, E-mail: [6thmeeting.ysma@culture.gr](mailto:6thmeeting.ysma@culture.gr), Fax: 210.32.51.620 (αρμοδία: κα Σοφού).

Ο Πρόεδρος της ΕΣΜΑ

Χ. Μπούρας

Ομότιμος καθηγητής ΕΜΠ

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**ARCHAEOLOGICAL AND**  
**ARCHAEOMETRIC APPROACHES TO THE**  
**STUDY OF BYZANTINE POTTERY FROM**  
**CRETE (END 4<sup>TH</sup> – 12<sup>TH</sup> C.), 2-DAY POTTERY**  
**WORKSHOP, PACHEIA AMMOS**  
**(IERAPETRA, CRETE), 13-14 SEPTEMBER**  
**2013**

ARISTOTLE UNIVERSITY OF THESSALONIKI  
INSTAP STUDY CENTER FOR EAST CRETE

Recent excavations of Byzantine sites on Crete and the subsequent publications, as well as a plethora of specialized studies, reflect a renewed interest in the Byzantine pottery from the island. In some cases these studies are combined with archaeometric analyses offering more synthetic approaches and interesting interpretations. The excavation of well-stratified sites and the study of other classes of material such as the lead seals and the coins have contributed greatly to a more secure dating of the pottery and a better understanding of the economic and trade activities of the various sites in Crete during the Byzantine period.

In light of these developments, it will be useful, therefore, to conduct the first scholarly meeting on the study of Byzantine pottery from Crete in a 2-day workshop, combining new data, theoretical approaches and a hands-on practical on pottery and ceramics petrography. The participants will have the opportunity to see the pottery from the Early Byzantine site of the islet of Pseira, discuss issues of pottery typology and chronology, and acquaint themselves with the petrographic microscope and the analyses of Byzantine pottery carried out across Crete. To facilitate the discussion and cover a broader array of subjects, we ask colleagues who have new material to give a short (10-15 min.) presentation with emphasis on new excavation data, stratigraphy, and pottery finds.

The meeting will take place at the INSTAP Study Center for East Crete, in Pacheia Ammos (Ierapetra, Crete). Participation is free but the participants will have to cover their transport and accommodation expenses. For organizational purposes we kindly ask those interested to send an email stating their intention to participate and whether they would like to give a short presentation.

Please send your emails to one of the following addresses: [npoulou@hist.auth.gr](mailto:npoulou@hist.auth.gr) or [enodarou@yahoo.gr](mailto:enodarou@yahoo.gr)

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# **XVII° UISPP WORLD CONGRESS IN BURGOS** **(SPAIN) SEPTEMBER 2014, SPECIAL** **COLLOQUIUM, THE REVOLUTION OF THE** **SIXTIES IN PREHISTORY AND** **PROTOHISTORY**

## **LA REVOLUTION DES ANNEES 60 EN PREHISTOIRE ET PROTOHISTOIRE**

Co-organisé par /Co-organized by Colin Renfrew, François Djindjian & Alessandro Guidi  
(UISPP commission 4 and commission 1)

### **Theme of the conference**

The post second war period (1955-1975) has been a revolution in the history of Prehistory and Protohistory : new paradigms (“new archaeology”), advanced field techniques, new disciplines (Archeometry, Geoarchaeology, etc.) and major methodological and technical advances, which have diffused in the whole archaeological field. The colloquium has the purpose to remember this golden age and to replace it in the general context of the progress of Sciences.

### **Key-words**

Absolute dating, aerial survey, archaeobotany, Archeometry, attribute analysis, biostratigraphy, casting, civil work machine use, chronostratigraphy, computing archaeology, culture resource management, data retrieval systems, dendrochronology, environment reconstitution, experimentation, functionalism, Geoarchaeology, geophysical survey, Harris diagrams, hypothetico deductive approach, image processing, lacustrine archaeology, large excavation programs, large open surface excavations, logicism, magnetism, micromorphology, mathematical modeling, multidimensional data analysis, paleoclimatology, paleodemography, physical-chemical characterization, quantitative archaeology, rescue archaeology, restoration, sampling, seriation, spatial analysis, statistics, underwater archaeology, systemic analysis, typologies, use wear analysis, etc.

### **Thème du colloque**

L’après deuxième guerre mondiale (1955-1975) a été une révolution dans l’histoire de la préhistoire et protohistoire : nouveaux paradigmes (« archéologie processuelle »), progrès des techniques de fouilles, nouvelles disciplines (archéométrie, géoarchéologie, etc.) et des progrès méthodologiques et techniques majeurs, qui ont diffusé dans le domaine archéologique tout entier. Le colloque a pour but de se remémorer cet âge d’or et de le replacer dans le contexte général de l’avancement des Sciences.

### **Mots-clés**

Datation absolue, prospection aérienne, archéobotanique, archéométrie, description formalisée des objets, biostratigraphie, moulages, utilisation d’engins de travaux civils, chrono-stratigraphie, archéologie informatique, gestion des ressources culturelles,

systemes documentaires, dendrochronologie, reconstitution de l'environnement, experimentation, fonctionnalisme, geoarcheologie, prospection geophysique, diagrammes de Harris, approche hypothetico deductive, traitement d'image, archeologie lacustre, grands programmes de fouilles, fouilles par grands decapages de surface, logicisme, magnetisme, micromorphologie, modelisation mathematique, analyse de donnees multidimensionnelles, paleoclimatologie, paleo-demographie, caracterisation physico-chimique, archeologie quantitative, archeologie preventive, restauration, echantillonnage, seriation, analyse spatiale, statistiques, archeologie sous-marine, analyse systemique, typologies, etudes des traces d'utilisation, etc..

Les propositions de communications doivent être envoyés à François Djindjian et Alessandro Guidi

François Djindjian ([francois.djindjian@wanadoo.fr](mailto:francois.djindjian@wanadoo.fr))

Alessandro Guidi ([alessandro.guidi@uniroma3.it](mailto:alessandro.guidi@uniroma3.it))

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# **THIRTEENTH ACCELERATOR MASS SPECTROMETRY CONFERENCE, 24-29 AUGUST 2014, AIX EN PROVENCE, FRANCE - FIRST ANNOUNCEMENT**

The Thirteenth Accelerator Mass Spectrometry (AMS 13) will be held from August 24th to 29th 2014 in Aix en Provence, France.

This first announcement provides information on the conference, on the registration and abstract submission processes. For enquiries, please still go to <http://ams13.cerege.fr/index.htm>! Bookmark this site in your favorite internet browser!

AMS-13 will be preceded by a two days pre-conference workshop to be held from August 22 to August 23, 2014 at the SEOLANE Centre. This workshop will focus on the most recent improvements of the current knowledge of in situ-produced cosmogenic nuclide production rates and on the use of multiple cosmogenic nuclides.

Aix and its surrounding region offer you a simple gift: Provence. Whenever you like, whenever you come, what matters is you. You will always find the landscapes that are loved by people all over the world and views that will take your breath away. The markets with all their flavours, the sunshine with its feast for the senses, the festivals and their thousand magical moments, the latest fashions, and the unique atmosphere of Provence. This means that Aix is very attractive at any time and especially in summer time. We thus recommend booking your accommodation as soon as possible. You will find discounted prices here: <http://ams13.cerege.fr/Accommodation.htm>.

## **REGISTRATION:**

For administrative reasons, your registration will be done in two steps:

- Pre-registration

(<http://dr12.azur-colloque.cnrs.fr/preinscription.php?colloque=144&lang=en>)

Once pre-registered, please wait to allow the organizers validating this first step. Then you will be asked to pay your registration.

**Note that registration site is already opened! Do not wait for the last minute!**

The fees are presented below. To facilitate reimbursement by your administration, a special offer including all expenses (inscription, lunches, coffee breaks, proceedings and Gala dinner) is proposed.

For the Accompanying Persons, the program will depend on the number of participants.

## **REGISTRATION FEES :**

	BEFORE APRIL 30, 2014	AFTER APRIL 30, 2014
FULL Permanent (Regular + Proceedings book + Gala dinner + Transportation	550 EUR !! Special offer !!	690 EUR
FULL Student (Regular + Proceedings book+ Gala dinner + Transportation	500 EUR !! Special offer !!	590 EUR



Permanent Regular		
+ Proceedings book (NIM B Elsevier)	470 EUR	600 EUR
Student Regular		
+Proceedings book (NIM B Elsevier)	420 EUR	500 EUR
Regular Inscription (Permanent)	400 EUR	500 EUR
Regular Inscription (Student)	350 EUR	400 EUR
Gala dinner + Transportation	90 EUR	90 EUR
Proceedings book only (NIM B Elsevier)	100 EUR	100 EUR
Pre-Conference Workshop all included (transportation, accommodation and meals)	300 EUR	350 EUR
Pre-Conference Workshop (without accommodation)	270 EUR	300 EUR

### **Accompanying Persons Program**

Monday 25 August : Paul Cézanne and the Sainte-Victoire Mountain. 20 EUR

Tuesday 26 August : Full day to Cassis. 70 EUR

Wednesday 27 August : Walk and discover Aix en Provence and follow Paul Cezanne.  
10 EUR

Online payments by credit cards only (Visa and MasterCard)

### **REGULAR REGISTRATION FEES INCLUDES:**

- Access to all conference sessions
- Conference materials
- Coffee breaks
- Lunches
- Conference Icebreaker on Sunday, 24 August 2014

Visit of Aix city and "Soirée Aixoise" at [Pavillon Vendôme](#). \*Please note that if you register as a student, a VALID full-time student proof is required to be sent to the conference secretariat prior to your arrival at the Conference. Please send to [ams13@cerege.fr](mailto:ams13@cerege.fr) a pdf copy of your Student ID. Please bring this ID card to Aix en Provence !

### **ABSTRACT SUBMISSION :**

AMS conferences are dedicated to machine development and new applications.

All routine applications are welcomed but as poster.

The proposed topics for the AMS 13 conference are presented below:

Topic Topic Code

Progress Report PRE

New and Future Facilities NFF

Ion Source and System Interface ISSI

Advances in AMS Technique AAT

AMS Carrier, Reference material and Intercomparison CRI

Measurement Difficulties of the Normalizing Stable

Isotopes MNSI

Sample Preparation SP

AMS and Heavy Nuclides AHN

Forensics and Nuclear Safeguards FNS

Combined Nuclides Applications CNA

General AMS Applications GAA

Abstracts are limited to 1500 words, including spaces. To submit, follow <http://ams13.cerege.fr/gestabstracts/index.php>.

At your first visit, press the button “I would like to have one”; you will then receive your Login and Password. Then fill the boxes!

All abstracts will be read by the scientific advisory committee that will attribute an oral presentation or a poster to the submitted contribution.

Concerning the pre-workshop conference, abstracts are limited to 4500 words, including spaces and have to be directly send to [ams13@cerege.fr](mailto:ams13@cerege.fr) in .rtf, .doc or .tex format.

Elsevier agrees to publish the proceedings of AMS13 conference. This book will also include papers from the pre-workshop conference. Contributions are expected to be submitted from October to December 2014; so start to write the papers ; ) !

Last information: for those that are not yet in the AMS13 mailing list, please send an email to [sympa@cerege.fr](mailto:sympa@cerege.fr) with subject: subscribe [ams13-aix@cerege.fr](mailto:ams13-aix@cerege.fr)

Good luck and see you soon in Aix en Provence!

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**ΘΕΣΕΙΣ ΕΡΓΑΣΙΑΣ/ΥΠΟΤΡΟΦΙΕΣ –**  
**JOB VACANCIES/FELLOWSHIPS**  
**PHD OPPORTUNITY AT AARHUS**  
**UNIVERSITY**

Dear colleagues,

A fully funded PhD studentship is available at Aarhus University on “Reconstructing solar variability and environmental changes based cosmogenic nuclides in tree-rings and ice cores”.

Further details and information on the application procedure can be found by following the link:

<http://talent.au.dk/phd/scienceandtechnology/opencalls/specific-projects/reconstructing-solar-variability-and-environmental-changes-based-cosmogenic-nuclides-in-tree-rings-and-ice-cores/>

cheers,

Jesper

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Jesper Olsen, Assistant Prof., phd  
AMS 14C Dating Centre  
Room 1522-328, phone +45 2338 2136  
Email [jesper.olsen@phys.au.dk](mailto:jesper.olsen@phys.au.dk)

Department of Physics and Astronomy  
Aarhus University  
Ny Munkegade 120  
DK-8000 Aarhus C  
Denmark

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**ACADEMIC POST IN THE FIELD OF**  
**MARINE AND COASTAL**  
**GEOARCHAEOLOGY, UNIVERSITY OF**  
**HAIFA**

University of Haifa  
Faculty of the Humanities  
And the Leon H. Charney School of Maritime Research  
The Department of Maritime Civilizations

The Graduate Department of Maritime Civilizations invites applications for an academic post in the field of marine and coastal geoarchaeology. Rank and tenure-track will be dependent on the academic achievements of the applicant and is subject to university regulations. The post is tenable from January, 2014.

The applicant will be expected to teach courses and carry out research on aspects of marine and coastal geoarchaeology and the reconstruction of ancient coastal environments in connection with archaeological sites, combine geological, geomorphologic, biological (with emphasize on macro-and micro-paleontology), archaeological and oceanographic methods. The applicant is expected to be familiar with the maritime heritage of the Israeli coast and, naturally, be willing to carry out the majority of his or her research there, partaking in interdisciplinary research teams. Preference will be given to applicants trained and experienced in diving and underwater research. Applicants must have completed their Ph.D. by 2011, and have gained post doctoral experience (in a research institute other than the one she or he received his Ph.D. from) in the field of marine and coastal geoarchaeology by the time they assume the position.

As the language at the university is Hebrew, it is expected that the successful candidate will be capable of teaching in Hebrew, in order that she or he shall be fully integrated into the local academic community.

Please send CV with list of publications, courses the applicant is able to teach, grants and fellowships awarded, samples of written and published work, experience in research, teaching, and supervising graduate students (if any) and the names and addresses of at least three referees to the search committee, by July 15, 2013.

**Please note: all hiring decisions are subject to budgetary approval by the University administration.**

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All correspondence should be addressed to:  
Dr. Assaf Yasur-Landau  
Department of Maritime Civilizations  
University of Haifa  
Mount Carmel,

Haifa 31905 Israel  
e-mail: [assafyasur@hotmail.com](mailto:assafyasur@hotmail.com)  
phone: 972-4-8240246

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**NATIONAL ELECTROSTATICS CORP.**  
**POSITION OPEN FOR AN ACCELERATOR**  
**PHYSICIST**

National Electrostatics Corp. has a position open for an accelerator physicist. See below. Although NEC manufactures a wide variety of electrostatic ion beam systems, a significant fraction are dedicated to Accelerator Mass Spectrometry. A significant fraction of these AMS machines are dedicated carbon dating systems.

Regards,

Greg Norton

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Dr. Gregory A. Norton	Phone: (608) 831-7600
Vice President, Marketing	Fax: (608) 831-9591
National Electrostatics Corp.	E-Mail <a href="mailto:nec@pelletron.com">nec@pelletron.com</a>
P.O. Box 620310	Web: <a href="http://www.pelletron.com">http://www.pelletron.com</a>
Middleton, WI 53562-0310 USA	

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**National Electrostatics Corp.**

7540 Graber Road, P.O. Box 620310  
Middleton, WI 53562-0310  
U.S.A.

Tel: (608) 831-7600  
Fax: (608) 831-9591  
E-mail: nec@pelletron.com  
Web: <http://www.pelletron.com>

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Position Open for  
**ACCELERATOR PHYSICIST**

June 14, 2013

This is a full-time professional position with excellent benefits. The work involves the design, documentation, production coordination, assembly, and commissioning of unique accelerator based scientific instruments and interfacing with customers and suppliers. Safe work habits, attention to detail, good attendance, good organizational and communication skills, and the ability to work and think independently and in a positive, professional manner are expected. Coordinated, cooperative work with others is essential. The starting rate of pay will depend on qualifications and experience.

Job Title: ACCELERATOR PHYSICIST  
(Assembly & Test Department)

Job Level: Professional

Essential Duties:

1. Design, assemble, test, debug, document, and install electrostatic accelerator systems.
2. Coordinate and expedite system level designs, production, and implementation, working with persons in design and production departments, suppliers, customers, etc.
3. Supervise installation and testing at customer sites worldwide.
4. Develop system level design (CAD) drawings and documentation.
5. Design parts and components.
6. Correspond with customers.

Qualifications:

Degree in Physics or Engineering, or equivalent (M.S. or Ph.D. preferred).

Skills and Experience Requirements:

1. Mechanical aptitude and mechanical design experience.
2. Experience building or modifying equipment or instruments.
3. Experience in vacuum system equipment and techniques.
4. Familiarity with basic electronics and experience using personal computers.
5. Familiarity with computer aided design programs, such as, AutoCAD or SolidWorks, is preferred, but not required.
6. Experience in designing items for production is preferred, but not required.
7. Experience with electrostatic accelerators and ion beams is a plus.

Physical Requirements:

1. Eyesight vision of, or corrected to, 20/20.
2. Able to use common hand and power tools (wrench, screwdriver, drill, etc.)
3. Ability to lift up to 35 pounds.
4. Ability to perform operations of manual dexterity, many of which are done while standing.

Send your resume to: National Electrostatics Corp.  
Attn: George Klody, Human Resources  
P. O. Box 620310  
Middleton, WI 53562-0310

*NEC is an Equal Opportunity Affirmative Action Employer - M/F, Vet/Disability.*

**PHD STUDENTSHIP AVAILABLE - THE**  
**SCOTTISH UNIVERSITIES**  
**ENVIRONMENTAL RESEARCH CENTRE**  
**(SUERC) AND HISTORIC SCOTLAND**

Dear All,

The Scottish Universities Environmental Research Centre (SUERC) and Historic Scotland are pleased to invite applications for a three-year AHRC-funded PhD Studentship (UK/EU rate) titled “Reassessing the Scottish Mesolithic-Neolithic transition: Questions of resource use and chronology”. This project will use light stable isotopes (C/N/S) and radiocarbon to examine prehistoric diets in the context of environmental and cultural change.

We would be delighted to hear from potential applicants for this position. Requirements include at least a 2:1 degree in environmental science, archaeology, geosciences or a related subject.

The studentship will commence 1 October 2013, or as soon as possible thereafter. Please contact Philippa Ascough ([philippa.ascough@gla.ac.uk](mailto:philippa.ascough@gla.ac.uk)) with any questions in the first instance.

For full details and information about how to apply, please visit [http://www.gla.ac.uk/research/az/suerc/news/headline\\_279835\\_en.html](http://www.gla.ac.uk/research/az/suerc/news/headline_279835_en.html)

With best wishes,

Philippa Ascough  
[philippa.ascough@gla.ac.uk](mailto:philippa.ascough@gla.ac.uk)

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## **ΑΝΑΚΟΙΝΩΣΕΙΣ - ANNOUNCEMENTS**

### **E-LEARNING ΣΤΗΝ ΑΡΧΑΙΟΜΕΤΡΙΑ (ΝΕΕΣ ΤΕΧΝΟΛΟΓΙΕΣ, ΣΥΝΤΗΡΗΣΗ & ΔΙΑΧΕΙΡΙΣΗ ΑΡΧΑΙΟΤΗΤΩΝ)**

(*σύντομα δημοσιοποιούνται τα νέα πιστοποιημένα προγράμματα δια βίου του Παν/μιου Αιγαίου στο <https://e-epimorfosi.aegean.gr>. Μετά τον επιτυχημένο Α' Κύκλο 2012-13, σας προωθούμε εκ των προτέρων ενημέρωση σχετικά με το Β' Κύκλο του ίδιου προγράμματός μας*)

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Ioannis Liritzis Ph.D (Edin.)

Professor of Archaeometry

Membre Correspondant de l'Academie des Sciences, Arts & Belles Lettres, Dijon, France

Member, European Academy of Sciences & Arts, Salzburg

PORTAL: [www.liritzis.gr](http://www.liritzis.gr)

University of the Aegean

Laboratory of Archaeometry (Director & Founder) Dept. of Mediterranean Studies

1 Demokratias Str.

Rhodes 85100 Greece

Tel.: +3022410-99385-6, Fax.: +3022410-99320

PORTAL: [www.liritzis.gr/](http://www.liritzis.gr/) URL: [www.rhodes.aegean.gr/tms](http://www.rhodes.aegean.gr/tms)

Editor-in-Chief: Mediterranean Archaeology & Archaeometry

([www.rhodes.aegean.gr/maa\\_journal](http://www.rhodes.aegean.gr/maa_journal))

#### MEMBER OF EDITORIAL BOARDS

Journal of Coastal Research - Archaeosciences (Revue d'Archeometrie) - Heritage & Society – Geochronometria - Asian Culture and History - Journal of Cultural Heritage - International Journal of Imaging & Robotics

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#### **e-Learning στην Αρχαιομετρία (Νέες Τεχνολογίες, Συντήρηση & Διαχείριση Αρχαιοτήτων)**

Διάρκεια: 37εβδομάδες

#### **1η Διδακτική Ενότητα: Αρχαιολογία & Θετικές Επιστήμες**

Διάρκεια: 5 εβδομάδες

30/9/2013 – 3/11/2013

Περιγραφή:

Οι 5 Συνεδρίες αναφέρονται: α) στις αρχαιολογικές περιόδους που χαρακτηρίζουν τις πολιτισμικές φάσεις των λαών της ΝΑ Μεσογείου και τους λόγους που οδήγησαν στην μη-γραμμική εξέλιξη των πολιτισμών αλλά στην χρονική ταξινόμησή τους (από την παλαιολιθική ως σήμερα), β) στην προϊστορία του Αιγαίου και της Μεσογείου με έμφαση στην έναρξη της γεωργικής παραγωγής στο εξαιρετικά μεγάλο επίτευγμα αυτό της

«Γεωργικής Επανάστασης» όπου οι λαοί έμαθαν να καλλιεργούν τη γη, γ) στην έννοια της διεπιστημονικότητας και της «μέτρησης» στην αρχαιολογία και την Ιστορία και δ) εισάγεται ο διεπιστημονικός κλάδος των αρχαιολογικών επιστημών ή αρχαιομετρίας δηλ. της εφαρμογής των θετικών επιστημών στην επίλυση αρχαιολογικών προβλημάτων. Δηλαδή πώς οι φυσικές επιστήμες χρησιμοποιούν την οργανολογία τους, τις μεθόδους και τεχνικές η κάθε μια χωριστά, και εφαρμόζονται στη μελέτη του υλικού πολιτισμού: για τον προσδιορισμό του χρόνου κατασκευής ή της δραστηριότητας, τον χαρακτηρισμό του υλικού, από πού προέρχεται (π.χ ποιό λατομείο), πώς κατασκευάστηκε, πώς μεταφέρθηκε ή τι υποδηλώνει η εύρεση κάποιου υλικού μακριά από το τόπο που υπήρχε, πως εντοπίζουμε θαμμένες αρχαιότητες (στο υπέδαφος και υποθαλάσσια), την αρχαία τεχνολογία π.χ του γυαλιού, του μπρούτζου, του κονιάματος, η αυθεντικότητα έργων τέχνης, η σύνδεση αρχαίας λατρείας και θρησκευτικών τελετών με τον τρόπο κατασκευής ναών κ.α.

Εβδομαδιαίες συνεδρίες:

1η Εβδομάδα: *Η μη-γραμμική εξέλιξη των πολιτισμών: διεπιστημονική πολυπαραμετρική ερμηνεία*

Διάρκεια: 30/9/2013 – 6/10/2013

2η Εβδομάδα: *Χρονολογική Ταξινόμηση Αρχαιολογικών Περιόδων*

Διάρκεια: 7/10/2013 – 13/10/2013

3η Εβδομάδα: *Προϊστορία της ΝΑ Μεσογείου/ Πρώιμη Γεωργία*

Διάρκεια: 14/10/2013 – 20/10/2013

4η Εβδομάδα: *Η έννοια της διεπιστημονικότητας & της μέτρησης στην Ιστορία και αρχαιολογία*

Διάρκεια: 21/10/2013 – 27/10/2013

5η Εβδομάδα: *Εισαγωγή στις Αρχαιολογικές Επιστήμες*

Διάρκεια: 28/10/2013 – 3/11/2013

Διδάσκοντες:

*Βαβουρανάκης Γεώργιος, Λέκτορας, Τμ. Ιστορίας Αρχαιολογίας, Πανεπιστήμιο Αθηνών*

*Λυριτζής Ιωάννης, Καθηγητής, Τμ. Μεσογειακών Σπουδών, Πανεπιστήμιο Αιγαίου*

*Βαφειάδου Ασημίνα, Δρ ΕΤΕΠ, Τμ. Μεσογειακών Σπουδών, Πανεπιστήμιο Αιγαίου*

## **2η Διδακτική Ενότητα: Παγκόσμιες κλιματικές μεταβολές & αρχαίοι πολιτισμοί (τα τελευταία 30.000 έτη)**

Διάρκεια: 4 εβδομάδες

4/11/2013 – 1/12/2013

Περιγραφή:

Οι παγκόσμιες κλιματικές μεταβολές που υπέστη ο πλανήτης μας τα τελευταία 30,000 χρόνια είχαν φανερές επιδράσεις στον άνθρωπο. Αυτή η περίοδος καλύπτει τον τελευταίο παγετώνα και μεσοπαγετώνα. Σ' αυτή την περίοδο θα αναφερθούμε στις φυσικές καταστροφές που επηρέασαν πολιτισμούς. Καταστροφές που προήλθαν από φυσικά (γεωλογικά, γεωφυσικά, αστρονομικά) αίτια, όπως μεγάλοι σεισμοί και συνοδευόμενα τσουνάμι, ηφαίστεια, μεταβολές στις τροχιακές παραμέτρους περιστροφής και περιφοράς της γης, πτώσεις μετεωριτών, αυξομειώσεις στην ηλιακή ακτινοβολία αυξομειώσεις της στάθμης της θάλασσας, κ.α.). Αναφέρονται παραδείγματα από την αρχαιότητα όπου αρχαίοι λαοί επηρεάστηκαν από τέτοια φαινόμενα- επηρεάστηκε η πρόοδος και ανάπτυξη τους, οι μεταναστεύσεις, οι αλληλεπιδράσεις μεταξύ γειτονικών λαών. Σημαντικά τέτοια φαινόμενα αποτέλεσαν θρύλους, μύθους με το σχετικό ποιητικό στοιχείο. Έτσι οι μυθολογούμενοι κατακλυσμοί θα μπορούσαν μάλλον να αναφέρονται σε τέτοια γεγονότα. Άλλωστε υπάρχει επιστημονική τεκμηρίωση για κάποιους ελληνικούς μύθους. Θα

αναφέρουμε το παράδειγμα του κατακλυσμού του Ιναχου στην Αργολίδα καθώς και θα προσδώσουμε στα μυθολογούμενα μια εναλλακτική ερμηνεία που αναφέρεται σε πραγματικά γεγονότα. Η παγκόσμια κλιματική αλλαγή σήμερα, πέραν των ανθρωπογενών επιδράσεων, έχει την δική της ιστορία στο πέρασμα των χιλιετιών που οφείλεται σε καθαρά φυσικά αίτια

Εβδομαδιαίες συνεδρίες:

1η Εβδομάδα: Φυσικές Καταστροφές στην Αρχαιότητα (τσουνάμι, σεισμοί, ηφαίστεια, μετεωρίτες)

Διάρκεια: 4/11/2013 – 10/11/2013

2η Εβδομάδα: Στάθμες της θάλασσας τα τελευταία 20.000 έτη (Αιγαίο, Μεσόγειος)

Διάρκεια: 11/11/2013 – 17/11/2013

3η Εβδομάδα: Μυθολογούμενοι Κατακλυσμοί: Ερμηνευτικές θεωρήσεις

Διάρκεια: 18/11/2013 – 24/11/2013

4η Εβδομάδα: Αναφορά στην Παγκόσμια Κλιματική αλλαγή

Διάρκεια: 25/11/2013 – 1/12/2013

Διδάσκοντες:

Ζούρος Νικόλαος, Αναπλ. Καθ., Τμ. Γεωγραφίας Πανεπιστήμιο Αιγαίου

Κωστοπούλου Ευθυμία, Λέκτορας, Τμ. Γεωγραφίας, Πανεπιστήμιο Αιγαίου

Λυριτζής Ιωάννης, Καθηγητής, Τμ. Μεσογειακών Σπουδών, Πανεπιστήμιο Αιγαίου

Βαφειάδου Ασημίνα, Δρ, ΕΤΕΠ, Τμ. Μεσογειακών Σπουδών, Πανεπιστήμιο Αιγαίου

### **3η Διδακτική Ενότητα: Μέθοδοι εντοπισμού θαμμένων μνημείων (χερσαία και θαλάσσια)**

Διάρκεια: 5 εβδομάδες

2/11/2013 – 19/01/2014

Περιγραφή:

Οι σύγχρονοι αρχαιολόγοι χρησιμοποιούν ως απαραίτητο εργαλείο την αρχαιογεωφυσική διασκόπηση πριν επιλέξουν ένα χώρο για ανασκαφή ή να ελέγξουν μια υποθαλάσσια περιοχή. Δηλαδή, δεν κάνουν ανασκαφές απλώς για να συσσωρεύουν δεδομένα, αλλά για να επιλύουν προβλήματα. Γι' αυτό και δεν ικανοποιούνται με την αναμονή κάποιας τυχαίας ανακάλυψης ή με το να ανασκάπτουν μνημεία απλώς επειδή έτυχε να είναι ορατά. Αντίθετα προσανατολίζουν την έρευνά τους εστιάζοντας την προσπάθεια στην ανύψωση ικανών αποδεικτικών στοιχείων, όπου και αν βρίσκονται αυτά. Έτσι οι αρχαιολόγοι επωφελούνται των νέων τεχνικών υπόγειας/ υποθαλάσσιας ανίχνευσης, τεχνικές που έχουν αναπτυχθεί σε προχωρημένο επίπεδο κατά την έρευνα εντοπισμού πετρελαίου, νερού, στρωματογραφικής διάταξης ή για στρατιωτικούς σκοπούς. Όσο οι αρχαιολόγοι μαθαίνουν να μοιράζονται τη μεγάλη περιπέτεια της προσανατολισμένης πλέον έρευνας, τόσο αρχίζουν να εκτιμούν τα γεωφυσικά όργανα και τις τεχνικές διασκόπησης για τον εντοπισμό θαμμένων αρχαιοτήτων όπως, το μαγνητόμετρο, το ηλεκτρόμετρο, το γεωραντάρ, το ηχοβολιστικό, το σεισμικό δονητή, την τηλεπισκόπηση, με διαφορετικές τεχνικές απεικόνισης σε 2Δ και 3Δ.

Θεμελίωση της αναγκαιότητας μεθόδων εντοπισμού και χαρτογράφησης θαμμένων αρχαιοτήτων. Σύντομη ιστορική ανασκόπηση της εξέλιξης των γεωφυσικών μεθόδων. Κατηγορίες μεθόδων. Καταλληλότητα μεθόδων σε σχέση με το πρόβλημα. Παραδεκτοί τρόποι παρουσίασης των δεδομένων.

Κλασικές μέθοδοι επεξεργασίας και παρουσίασης δεδομένων γεωφυσικής χαρτογράφησης. Μη συμβατική χρήση μεθόδων γεωφυσικής διασκόπησης για επίλυση συγκεκριμένων αρχαιολογικών προβλημάτων (π.χ. εντοπισμός ταφικών μνημείων σε τύμβους, τύμβους, υγρασία τοίχων, βάθος ρωγμών σε γλυπτά, κ.λ.π.).

Εβδομαδιαίες συνεδρίες:

*1η Εβδομάδα: Εισαγωγή στις αρχαιογεωφυσικές διασκοπήσεις*

*Διάρκεια: 2/12/2013 – 8/12/2013*

*2η Εβδομάδα: Ηλεκτρική Διασκόπηση & Γεωραντάρ*

*Διάρκεια: 9/12/2013 – 15/12/2013*

*3η Εβδομάδα: Μαγνητική Διασκόπηση*

*Διάρκεια: 16/12/2013 – 22/12/2013*

*4η Εβδομάδα: Ηχοβολιστικά (Sonars), Μαγνητόμετρα & Ρομποτική στην διασκόπηση βυθού*

*Διάρκεια: 6/1/2014 – 12/1/2014*

*5η Εβδομάδα: Τεχνικές Τηλεπισκόπησης*

*Διάρκεια: 13/1/2014 – 19/1/2014*

*Διδάσκοντες:*

*Τσόκας Γρηγόριος, Καθηγητής, Τμ. Γεωλογίας, ΑΠΘ*

*Τσούρλος Παναγιώτης, Αναπλ. Καθηγητής, Τμ. Γεωλογίας, ΑΠΘ*

*Χατζόπουλος Ιωάννης, Καθηγητής, Τμ. Περιβάλλοντος, Πανεπιστήμιο Αιγαίου*

*Σακελαρίου Δημήτριος, Ερευνητής Α', ΕΛ.ΚΕ.Θ.Ε*

*Λυριτζής Ιωάννης, Καθηγητής, Τμ. Μεσογειακών Σπουδών, Πανεπιστήμιο Αιγαίου*

*Βαφειάδου Ασημίνα, ΕΤΕΠ, Τμ. Μεσογειακών Σπουδών, Πανεπιστήμιο Αιγαίου*

#### **4η Διδακτική Ενότητα: Μέθοδοι Χρονολόγησης**

*Διάρκεια: 4 εβδομάδες*

*20/1/2014 – 16/2/2014*

*Περιγραφή:*

*Η ενότητα αφορά μεθόδους και τεχνικές χρονολόγησης, αφού χωρίς ένα ταξινομημένο σύστημα αναφοράς η αναπαράσταση της ιστορίας του ανθρώπου δεν είναι εφικτή. Ο τρόπος με τον οποίο οι αρχαιολόγοι διεξάγουν την έρευνά τους εξαρτάται σε μεγάλο βαθμό από την ακρίβεια της χρονολόγησης για την χρονική περίοδο που μελετάται. Θα αναπτυχθούν οι φυσικοί μηχανισμοί που αφορούν μεθόδους χρονολόγησης όπως, οι Σχετικές μέθοδοι (π.χ. στρωματογραφία, Ουρανίου - Αζώτου - Φθορίου, παλυνολογία, κ.α) και οι ποσοτικά ακριβείς μέθοδοι χρονολόγησης, όπως ο ραδιάνθρακας (ή άνθρακας C-14) σε κάρβουνο, οστά κ.α., η Θερμοφωταύγεια και Οπτικά Προτρεπομένη Φωταύγεια σε κεραμικά, οπτόπλινθους, ιζήματα, κονιάματα κ.α, ο αρχαιομαγνητισμός που βασίζεται στη μέτρηση των τριών συνιστωσών του μαγνητικού πεδίου της γης (ένταση, απόκλιση και έγκλιση), του Ουρανίου /Θορίου που βασίζεται στην ραδιενεργό ανισοροπία της σειράς του φυσικού Ουρανίου-238, η μέθοδος Καλίου- Αργού (το αργό παράγεται από το κάλιο), των τροχιών σχάσεως που δημιουργούνται κατά την αυθόρμητη σχάση του πυρήνα του ουρανίου και της ενυδάτωσης των λίθινων εργαλείων από Οψιανό. Θα αναφερθούν παραδείγματα εφαρμογών, περιορισμοί, σφάλματα και φυσικά όλα τα υλικά που εφαρμόζονται αυτές οι μέθοδοι*

*Εβδομαδιαίες συνεδρίες:*

*1η Εβδομάδα: Σχετικές & Απόλυτες μέθοδοι χρονολόγησης*

*Διάρκεια: 20/1/2014 – 26/1/2014*

*2η Εβδομάδα: Ραδιάνθρακας & Δενδροχρονολογία – θεωρία και εύρεση ηλικίας*

*Διάρκεια: 27/1/2014 – 2/2/2014*

*3η Εβδομάδα: Θερμο- & Οπτική Φωταύγεια/ Ηλεκτρονικού παραμαγνητικού Συντονισμού – θεωρία και εύρεση ηλικίας*

*Διάρκεια: 3/2/2014 – 9/2/2014*

*4η Εβδομάδα: Σύμμεικτα (αρχαιομαγνητισμός, Ουρανίου/Θορίου, Τροχιές Σχάσης, Ενυδάτωση Οψιανού, χρονολόγηση Βραχογραφιών, Μολύβδου-210, Καλίου-Αργού)*

*Διάρκεια: 10/2/2014 – 16/2/2014*

Διδάσκοντες:

Ζαχαριάς Νικόλαος, Αναπλ. Καθηγητής, Τμ. Ιστορίας, Αρχαιολογίας και Διαχείρισης Πολιτισμικών Πόρων, Πανεπιστήμιο Πελοποννήσου

Λυριτζής Ιωάννης, Καθηγητής, Τμ. Μεσογειακών Σπουδών, Πανεπιστήμιο Αιγαίου  
Βαφειάδου Ασημίνα, ΕΤΕΠ, Τμ. Μεσογειακών Σπουδών, Πανεπιστήμιο Αιγαίου

### **5η Διδακτική Ενότητα: Μέθοδοι χαρακτηρισμού & προέλευσης αρχαιοϋλικών**

Διάρκεια: 4 εβδομάδες

17/2/2014 – 16/3/2014

Περιγραφή:

Ο χαρακτηρισμός των τέχνεργων και υλικών που σχετίζονται με την αρχαιολογική έρευνα και τη μελέτη της πολιτισμικής κληρονομιάς, αναφέρεται στην φυσικοχημική και αναλυτική μελέτη τους με εργαστηριακές πρακτικές και οργανολογίες. Η ολοκλήρωση των εργασιών χαρακτηρισμού, συνεισφέρουν στα τεχνολογικά συμπεράσματα της έρευνας ενώ παράλληλα σχηματίζεται η εικόνα της προέλευσης και διακίνησης υλικών και τέχνεργων, βασισμένη κυρίως στα αναλυτικά δεδομένα και κατόπιν δημιουργίας μεγάλων βάσεων δεδομένων. Συμπερασματικά, οι εργασίες χαρακτηρισμού, αποτελούν το αρχικό και αναπόσπαστο μέρος της μελέτης των υλικών της αρχαιολογικής έρευνας, τα αποτελέσματα της οποίας συνεισφέρουν πολλαπλώς στην ανασύνθεση της εικόνας της εποχής (τεχνολογία, οικονομία, εμπόριο) όπου αναφέρονται. Θα περιγραφτούν αρκετές μέθοδοι ανάλυσης αρχαιοϋλικών όπως φασματοσκοπικές, ισοτοπικές, με νετρόνια, ατομικής απορρόφησης, φασματοσκοπίας ακτίνων-Χ φθορισμού, ραμάν, με φασματογράφο μάζας, ιοντικών δεσμών, πυρηνικές κ.α. Δίνονται παραδείγματα, τα υλικά εφαρμογής, μη καταστρεπτικές τεχνικές κυρίως με φορητές συσκευές.

Εβδομαδιαίες συνεδρίες:

1η Εβδομάδα: Εισαγωγή στον χαρακτηρισμό και ανάλυση αρχαιοϋλικών (οργανολογία, υλικά, στατιστική, προέλευση)

Διάρκεια: 17/2/2014 – 23/2/2014

2η Εβδομάδα: Φασματοσκοπικές μέθοδοι ανάλυσης (Νετρονική, Μέθοδοι Ισοτόπων, Ατομικής απορρόφησης, οπτικής Έκπομπής)

Διάρκεια: 24/2/2014 – 2/3/2014

3η Εβδομάδα: Μη καταστρεπτικές Μέθοδοι (Ραμάν, Φθορισμού, Λέιζερ, SIMS)

Διάρκεια: 3/3/2014 – 9/3/2014

4η Εβδομάδα: Μέθοδοι ανάλυσης οργανικών υλικών

Διάρκεια: 10/3/2014 – 16/3/2014

Διδάσκοντες:

Ζαχαριάς Νικόλαος, Αναπλ. Καθηγητής, Τμ. Ιστορίας, Αρχαιολογίας και Διαχείρισης Πολιτισμικών Πόρων, Πανεπιστήμιο Πελοποννήσου

Λυριτζής Ιωάννης, Καθηγητής, Τμ. Μεσογειακών Σπουδών, Πανεπιστήμιο Αιγαίου  
Βαφειάδου Ασημίνα, ΕΤΕΠ, Τμ. Μεσογειακών Σπουδών, Πανεπιστήμιο Αιγαίου

### **6η Διδακτική Ενότητα: Σωστικά μέτρα στην συντήρηση τέχνεργων και μνημείων (χερσαία & υδάτινα οικοσυστήματα).**

Διάρκεια: 6 εβδομάδες

17/3/2014 – 4/5/2014

Περιγραφή:

Η ενότητα περιλαμβάνει δεδομένα προληπτικής συντήρησης μνημείων και αρχαιολογικών αντικειμένων, αφού προηγηθεί η μελέτη του περιβάλλοντος και των διαβρωτικών παραγόντων που επιδρούν στο δομικό τους υλικό, φυσικοχημικά και αισθητικά. Περιλαμβάνει, επιπλέον, τις διαδικασίες διάβρωσης των διαφόρων δομικών υλικών των

μνημείων και των αρχαιολογικών αντικειμένων. Οι παράγοντες του διαβρωτικού περιβάλλοντος διακρίνονται σε άμεσους (υγρασία, θερμοκρασία, ακτινοβολίες και βιολογικούς παράγοντες) και έμμεσους (ρύπανση, δονήσεις, ανθρώπινους παράγοντες) και οι μέθοδοι προληπτικής συντήρησης εφαρμόζονται στην μετρίαση της δράσης αυτών των παραγόντων. Εξετάζονται ζητήματα που αφορούν στο χειρισμό, την αποθήκευση, την έκθεση και τη μεταφορά των αρχαιολογικών αντικειμένων. Επίσης περιλαμβάνει δεδομένα πρώτων σωστικών μέτρων συντήρησης υποθαλάσσιων μνημείων και έργων τέχνης, αφού προηγηθεί η μελέτη του περιβάλλοντος και των διαβρωτικών παραγόντων που επιδρούν στο δομικό τους υλικό, φυσικοχημικά και αισθητικά. Στα υλικά θα περιλαμβάνονται ξύλινα, μεταλλικά, κεραμικά, γυάλινα, λίθινα κ.α.

Εβδομαδιαίες συνεδρίες:

1η Εβδομάδα: Εισαγωγή στην Προληπτική Συντήρηση και τη Συντήρηση αρχαιοτήτων

Διάρκεια: 17/3/2014 – 23/3/2014

2η Εβδομάδα: Οργανικά Υλικά (ύφασμα, δέρμα, χαρτί)

Διάρκεια: 24/3/2014 – 30/3/2014

3η Εβδομάδα: Ανόργανα Υλικά (κεραμικά, γυάλινα, λίθινα)

Διάρκεια: 31/3/2014 – 6/4/2014

4η Εβδομάδα: Περιβαλλοντικές παράμετροι μουσείων και επιπτώσεις τους στη διατήρηση της υλικής πολιτιστικής κληρονομιάς

Διάρκεια: 7/4/2014 – 13/4/2014

5η Εβδομάδα: Σωστικές παρεμβάσεις στη συντήρηση άνυδρων και ένυδρων ξύλινων υλικών

Διάρκεια: 14/4/2014 – 27/4/2014

6η Εβδομάδα: Μεταλλικά Αντικείμενα

Διάρκεια: 28/4/2014 – 4/5/2014

Διδάσκοντες:

Αργυροπούλου Βασιλική, Καθηγήτρια, Τμ. Συντήρησης Αρχαιοτήτων και έργων Τέχνης, ΑΤΕΙ Αθήνας.

Λαμπρόπουλος Βασίλειος, Καθηγητής, Τμ. Συντήρησης Αρχαιοτήτων και έργων Τέχνης, ΑΤΕΙ Αθήνας.

Παναγιάρης Γεώργιος, Καθηγητής, Τμ. Συντήρησης Αρχαιοτήτων και έργων Τέχνης, ΑΤΕΙ Αθήνας.

Πούρνου Αναστασία, Αναπλ. Καθηγήτρια, Τμ. Συντήρησης Αρχαιοτήτων και έργων Τέχνης, ΑΤΕΙ Αθήνας.

Ανδρουτσόπουλος Νικόλαος, Εργαστηριακός Συνεργάτης, Τμ. Συντήρησης Αρχαιοτήτων και έργων Τέχνης, ΑΤΕΙ Αθήνας.

Πέτρου Μαρία, Εργαστηριακός Συνεργάτης, Τμ. Συντήρησης Αρχαιοτήτων και έργων Τέχνης, ΑΤΕΙ Αθήνας.

Γιαννουλάκη Μαρία, Εργαστηριακός Συνεργάτης, Τμ. Συντήρησης Αρχαιοτήτων και έργων Τέχνης, ΑΤΕΙ Αθήνας.

### **7η Διδακτική Ενότητα: Νέες Τεχνολογίες στην Αρχαιολογία**

Διάρκεια: 4 εβδομάδες

5/5/2014 – 1/6/2014

Περιγραφή:

Στη συγκεκριμένη ενότητα θα μελετηθούν οι πιο διαδεδομένες σε διεθνές επίπεδο μέθοδοι και τεχνικές που προσφέρουν οι σύγχρονες τεχνολογίες και θα μελετηθούν περιπτώσεις χρήσης των νέων τεχνολογιών, όπως η χρήση των βάσεων δεδομένων, η εικονική πραγματικότητα, τα Γεωγραφικά Συστήματα Πληροφοριών (ΓΣΠ/GIS) και διαφόρων

μορφών πολυμεσικών εφαρμογών στην πολιτιστική κληρονομιά, με παραδείγματα τόσο από τη διεθνή κοινότητα όσο και από την Ελλάδα.

*Εβδομαδιαίες συνεδρίες:*

*1η Εβδομάδα: Ο ρόλος και η χρήση των πολυμεσικών εφαρμογών στην ανασύσταση, καταγραφή, τεκμηρίωση, διαχείριση και προβολή των αρχαιολογικών δεδομένων*

*Διάρκεια: 5/5/2014 – 11/5/2014*

*2η Εβδομάδα: Πολιτισμική Τεχνολογία στην Αρχαιολογία: Βάσεις Δεδομένων*

*Διάρκεια: 12/5/2014 – 18/5/2014*

*3η Εβδομάδα: Ψηφιακός πολιτισμός και 'εικονικά μουσεία'*

*Διάρκεια: 19/5/2014 – 25/5/2014*

*4η Εβδομάδα: GIS στην Αρχαιολογία & Νέες εξελίξεις οπτικοποίησης γεωγραφικού χώρου στην αρχαιολογία.*

*Διάρκεια: 26/5/2014 – 1/6/2014*

*Διδάσκοντες:*

*Χατζόπουλος Ιωάννης, Καθηγητής, Τμ. Περιβάλλοντος, Πανεπιστήμιο Αιγαίου*

*Οικονόμου Μαρία, Αναπλ. Καθηγήτρια, Τμ. Πολιτ. Τεχνολογίας και Επικοινωνίας, Πανεπιστήμιο Αιγαίου*

*Καβακλή Ευαγγελία, Επικ. Καθηγήτρια, Τμ. Πολιτ. Τεχνολογίας και Επικοινωνίας, Πανεπιστήμιο Αιγαίου*

*Τσιαφάκη Δέσποινα, Ερευνήτρια, ΙΠΕΤ, Ερ. Κέντρο «Αθηνά», Ξάνθη*

### **8η Διδακτική Ενότητα: Πολιτιστική διαχείριση & πολιτιστικός Τουρισμός**

*Διάρκεια: 5 εβδομάδες*

*2/6/2014 – 6/7/2014*

*Περιγραφή:*

*Μία από τις πλέον γνωστές μορφές εναλλακτικού τουρισμού είναι ο αποκαλούμενος 'πολιτιστικός τουρισμός' (cultural tourism). Οι σύγχρονες διεθνείς μελέτες δείχνουν ότι ο εξειδικευμένος τουρισμός και δη αυτός που αφορά στην πολιτιστική κληρονομιά, παρουσιάζει αυξητική πορεία με ολοένα μεγαλύτερο ενδιαφέρον από την πλευρά των τουριστών. Αντικείμενο αυτής της Ενότητας είναι η πραγμάτευση της κατηγορίας αυτής του τουρισμού σε συνδυασμό με τη διαχείριση της ίδιας της πολιτιστικής κληρονομιάς που αποτελεί το προσφερόμενο 'προϊόν'. Για τον λόγο αυτό θα παρουσιαστούν εργαλεία, μέθοδοι και τρόποι που οδηγούν στην ανάδειξη και την προώθηση του πολιτιστικού υλικού και στη διαχείρισή του στη θεωρία και την πράξη.*

*Μέσα από τον παγκόσμιο ιστό παρέχεται μια πληθώρα πληροφοριών που αφορούν στον πολιτισμό και μπορούν να συμβάλλουν ουσιαστικά στην προώθησή του. Το θέμα αυτό θα εξεταστεί, όπως και άλλοι τρόποι προώθησης οι οποίοι συνδέονται άμεσα με τη σωστή και πλήρη τεκμηρίωση και ανάδειξη του πολιτιστικού προϊόντος. Ειδικότερα για το θέμα της πολιτιστικής διαχείρισης θα παρουσιαστούν παραδείγματα από ιδιαίτερα σημαντικούς τομείς της πολιτιστικής κληρονομιάς, όπως αυτοί των Μουσειακών Συλλογών και των Αρχαιολογικών / Ιστορικών Συνόλων, και της αρχιτεκτονικής αρχαιολογικού τοπίου. Σύνδεση της διαχείρισης αρχαιοτήτων με τους Διεθνείς οργανισμούς και το νομικό καθεστώς που διέπει την ανάδειξη αρχαιολογικών μνημείων και θέσεων ως σύμβολα παγκόσμιας κληρονομιάς.*

*Εβδομαδιαίες συνεδρίες:*

*1η Εβδομάδα: Διαχείριση Αρχαιοτήτων και Διεθνείς Οργανισμοί*

*Διάρκεια: 2/6/2014 – 8/6/2014*

*2η Εβδομάδα: Διαχείριση Μουσειακών Συλλογών & αρχαιολογικών/ιστορικών συνόλων*

*Διάρκεια: 9/6/2014 – 15/6/2014*

*3η Εβδομάδα: Ιστότοποι στην προώθηση πολιτιστικού υλικού*

*Διάρκεια: 16/6/2014 – 22/6/2014*

*4η Εβδομάδα: Ανάδειξη, Τεκμηρίωση, Προώθηση Πολιτιστικού Προϊόντος.*

*Διάρκεια: 23/6/2014 – 29/6/2014*

*5η Εβδομάδα: Πολιτιστική διαχείριση: Δυο πιλοτικά παραδείγματα θεωρίας και πράξης.*

*Διάρκεια: 30/6/2014 – 6/7/2014*

*Διδάσκοντες:*

*Γκανιάτσας Βασίλειος, Καθηγητής, Τμ. Αρχιτεκτόνων, ΕΜΠ*

*Καλλονιάτης Χρήστος, Λέκτορας, Τμ. Πολιτ. Τεχνολογίας και Επικοινωνίας, Πανεπιστήμιο Αιγαίου*

*Δρ Αλεξάκη Ευγενία, ΕΑΠ*

*Τσιαφάκη Δέσποινα, Ερευνήτρια, ΙΠΕΤ, Ερ. Κέντρο «Αθηνά», Ξάνθη*

*Δρ Κόρκα Έλενα, Αρχαιολόγος, Εφορεία Αρχαιοπωλείων και Ιδιωτικών Αρχαιολογικών Συλλογών.*



## **E-LEARNING ΣΤΗΝ ΑΡΧΑΙΟΑΣΤΡΟΝΟΜΙΑ** **(ΕΠΙΔΡΑΣΗ ΑΣΤΡΟΝΟΜΙΑΣ ΣΤΟΥΣ** **ΠΟΛΙΤΙΣΜΟΥΣ ΚΑΙ ΕΚΜΑΘΗΣΗ** **ΨΗΦΙΑΚΩΝ ΤΕΧΝΙΚΩΝ)**

(*σύντομα δημοσιοποιούνται τα νέα Πιστοποιημένα Προγράμματα δια βίου του Παν/μιου Αιγαίου στο <https://e-epimorfosi.aegean.gr>. Σας προωθούμε εκ των προτέρων ενημέρωση σχετικά με το πρόγραμμά μας)*)

\*\*\*\*\*

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**e-learning στην Αρχαιοαστρονομία (Επίδραση αστρονομίας στους πολιτισμούς και Εκμάθηση ψηφιακών τεχνικών)**

Διάρκεια: 12 εβδομάδες

A' κύκλος: 30/9/2013 – 22/12/2013

B' κύκλος: 13/1/2014 – 7/4/2014

**1η Διδακτική Ενότητα: Εισαγωγή στην Αρχαιοαστρονομία – Εκμάθηση βασικών ψηφιακών προγραμμάτων**

Διάρκεια: 6 εβδομάδες

A' κύκλος: 30/9/2013 – 10/11/2013

B' κύκλος: 13/1/2014 – 23/2/2014

Περιγραφή:

Η ενότητα αυτή εισάγει τον επιμορφούμενο στο επιστημονικό πεδίο της Αρχαιοαστρονομίας και εξηγεί γιατί ο ουρανός είχε ξεχωριστή σημασία και χρησιμότητα για κάθε πολιτισμό. Περιγράφει πώς διεξάγεται μια σύγχρονη αρχαιολογική έρευνα με

το πρόσθετο στοιχείο της αστρονομικής διάστασης, ποιοι είναι οι στόχοι της και με ποια επιστημονικά εργαλεία γίνεται η ανάλυση των ευρημάτων τα οποία υποδηλώνουν εμμέσως ή ευθέως την σύνδεση των αρχαίων λαών με την παρατηρησιακή αστρονομία. Αναλύεται η κίνηση του ήλιου, της σελήνης, των πλανητών και των άστρων, καθώς και τα κυριότερα αστρονομικά φαινόμενα: ηλιοστάσια, ισημερίες, πανσέληνοι, ηλιακές ανατολές άστρων. Η ενότητα εξηγεί πώς τα φαινόμενα αυτά χρησιμοποιήθηκαν από τον εκάστοτε πολιτισμό για την δημιουργία του ημερολογίου που ταίριαζε καλύτερα στις ανάγκες του. Μελετώνται οι τρόποι διατήρησης της αρχαίας αστρονομικής γνώσης στα αρχαιολογικά ευρήματα και ειδικά ο προσανατολισμός ναών και ταφικών μνημείων. Επίσης, στην ενότητα αυτή εξετάζεται η ιστορία και η θεώρηση της αστρολογίας μέσα από την φιλοσοφική θεωρία (ιδιαίτερα των προσωκρατικών και μετέπειτα) και η επίδραση της στην κοινωνία. Επιπλέον, ο επιμορφούμενος θα εξοικειωθεί με τις βασικές λειτουργίες προγραμμάτων απεικόνισης του νυχτερινού ουρανού (π.χ. Stellarium) και γεωγραφικών πληροφοριών (π.χ. Google Earth), που παρέχονται δωρεάν. Θα μάθει πώς να αναζητά online στοιχεία από βάσεις δεδομένων, βιβλιοθήκες και περιοδικά, που θα του είναι χρήσιμα στην αρχαιοαστρονομική έρευνα (π.χ. αρχιτεκτονικά πλάνα, στρωματογραφία, χρονολόγηση). Θα μάθει πώς χρησιμοποιείται η πυξίδα, το κλισίμετρο και το GPS στον υπολογισμό της ουράνιας απόκλισης.

Εβδομαδιαίες συνεδρίες:

1η Εβδομάδα: Εισαγωγή στην Αρχαιοαστρονομία: ex caelum lux

Διάρκεια: 30/9/2013 – 6/10/2013

Διδάσκοντες: Ιωάννης Λυριτζής (Καθηγητής, Παν/μιο Αιγαίου)

2η Εβδομάδα: Αρχαιολογική έρευνα και ερμηνεία

Διάρκεια: 7/10/2013 – 13/10/2013

Διδάσκοντες: Αιμιλία Μπάνου (επικ. Καθηγήτρια, Παν/μιο Πελοποννήσου)

3η Εβδομάδα: Κύρια αστρονομικά φαινόμενα: ανάλυση των κινήσεων ήλιου, σελήνης, πλανητών και άστρων

Διάρκεια: 14/10/2013 – 20/10/2013

Διδάσκοντες: Ιωάννης Λυριτζής (Καθηγητής), Γεράσιμος Αρτελάρης (υποψ. Διδάκτορας)

4η Εβδομάδα: Ο ουρανός ως ρολόι: Αρχαία ημερολόγια

Διάρκεια: 21/10/2013 – 27/10/2013

Διδάσκοντες: Ευστράτιος Θεοδοσίου (αναπλ. Καθηγητής, Τμ Φυσικής, ΕΚΠΑ)

5η Εβδομάδα: Αστρονομικός προσανατολισμός μνημείων

Διάρκεια: 28/10/2013 – 3/11/2013

Διδάσκοντες: Ιωάννης Λυριτζής (Καθηγητής), Γεράσιμος Αρτελάρης (υποψ. Διδάκτορας)

6η Εβδομάδα: Αστρολογία: Φιλοσοφική θεωρία και απήχηση στην κοινωνία

Διάρκεια: 4/11/2013 – 10/11/2013

Διδάσκοντες: Μαρία Παπαθανασίου (Καθηγήτρια, Τμ Μαθηματικών, ΕΚΠΑ)

## **2η Διδακτική Ενότητα: Η Αρχαιοαστρονομία ανά τον κόσμο – Εκμάθηση εξειδικευμένων ψηφιακών εφαρμογών**

Διάρκεια: 6 εβδομάδες

A' κύκλος: 11/11/2013 – 22/12/2013

B' κύκλος: 24/2/2014 – 7/4/2014

Περιγραφή:

Στην ενότητα αυτή εξετάζονται οι αστρονομικές γνώσεις διαφορετικών αρχαίων πολιτισμών και η χρησιμότητά τους στις καθημερινές αλλά και στις λατρευτικές τους συνήθειες. Πρώτος σταθμός ο Ελλαδικός χώρος, όπου διερευνώνται οι εφαρμογές της

αστρονομικής γνώσης από την Μινωική Κρήτη ως το Βυζάντιο. Ιδιαίτερη έμφαση δίνεται στην κλασική και ελληνιστική περίοδο. Εξετάζονται οι μεταβολές των λατρευτικών πρακτικών, και οι πρακτικές αστρονομικές χρήσεις ανάμεσα σε πολιτισμούς που αναπτύχθηκαν σε διαφορετικά γεωγραφικά πλάτη (π.χ. Μάγια και Ίνκα σε Κεντρική και Νότια Αμερική αντίστοιχα, αρχαία Αίγυπτος, κ.ά.). Μελετώνται οι τρόποι επεξεργασίας δεδομένων μέσω απλών στατιστικών μοντέλων για την εξαγωγή συμπερασμάτων, ειδικά όταν δεν υπάρχουν άλλα στοιχεία. Ακολουθεί η διδασκαλία των βασικών εννοιών, μεθόδων και κανόνων της χρήσης Συστημάτων Γεωγραφικών Πληροφοριών (GIS), και η εφαρμογή τους στην Αρχαιοαστρονομία. Μια συνεδρία αφιερώνεται στην σχέση της αρχαίας παρατηρησιακής αστρονομίας με την ανάπτυξη της Γεωδαισίας και τελικά του GPS. Η ενότητα ολοκληρώνεται με την εφαρμογή των ήδη διδαχθέντων μεθόδων σε ένα πλήρες παράδειγμα που ξεκινάει από την μέτρηση και καταλήγει στην τελική ανάλυση των αποτελεσμάτων. Επιπλέον, ο επιμορφούμενος διδάσκεται την ειδικότερη χρήση ψηφιακών προγραμμάτων (π.χ. Stellarium, Google Earth, Starry Night κ.ά), την δημιουργία βάσεων δεδομένων και γραφικών παραστάσεων (π.χ. σε Excel), καθώς και τη βασική χρήση στατιστικών προγραμμάτων (π.χ. R).

Εβδομαδιαίες συνεδρίες:

1η Εβδομάδα: Αστρονομία στην Αρχαία Ελλάδα: Από τη Μινωική Κρήτη ως το Βυζάντιο

Διάρκεια: 11/11/2013 – 17/11/2013

Διδάσκοντες: Μαρία Παπαθανασίου (Καθηγήτρια, Τμ Μαθηματικών, ΕΚΠΑ), Ξενοφών Μουσάς (Καθηγητής, Τμ. Φυσικής, ΕΚΠΑ)

2η Εβδομάδα: Η επίδραση της αστρονομίας ανά τον κόσμο

Διάρκεια: 18/11/2013 – 24/11/2013

Διδάσκοντες: Ιωάννης Λυριτζής (Καθηγητής), Γεράσιμος Αρτελάρης (υποψ. Διδάκτορας)

3η Εβδομάδα: Βασικές στατιστικές μέθοδοι

Διάρκεια: 25/11/2013 – 1/12/2013

Διδάσκοντες: Ιωάννης Λυριτζής (Καθηγητής), Γεράσιμος Αρτελάρης (υποψ. Διδάκτορας)

4η Εβδομάδα: Βάσεις Δεδομένων & χρήση των Συστημάτων Γεωγραφικών Πληροφοριών (GIS) στην Αρχαιοαστρονομία

Διάρκεια: 2/12/2013 – 8/12/2013

Διδάσκοντες: Ιωάννης Χατζόπουλος (Καθηγητής, Παν/μιο Αιγαίου)

5η Εβδομάδα: Από την αρχαία παρατηρησιακή αστρονομία, στη Γεωδαισία και στο GPS

Διάρκεια: 9/12/2013 – 15/12/2013

Διδάσκοντες: Ιωάννης Χατζόπουλος (Καθηγητής)

6η Εβδομάδα: Ψηφιακά Εργαλεία στην Αρχαιοαστρονομία: Μια ολοκληρωμένη παραδειγματική περίπτωση

Διάρκεια: 16/12/2013 – 22/12/2013

Διδάσκοντες: Ιωάννης Λυριτζής (Καθηγητής), Γεράσιμος Αρτελάρης (υποψ. Διδάκτορας)

[με την συμβολή υλικού των Prof Juan Belmonte (Spain), Prof. Giulio Magli (Italy), Dr M.Rappengluck (Germany)]

## **CALL FOR CONTRIBUTIONS TO ROTHENBERG'S VOLUME ON COPPER IN ANTIQUITY**

Following the conference in honor of the late Professor Beno Rothenberg, “Mining for Copper: Environment, Culture and Copper in Antiquity” (April 2013, Timna, Israel), we intend to publish the proceedings as part of the Tel Aviv University Institute of Archaeology Occasional Publication Series. For this volume we also accept relevant manuscripts from researchers who could not attend the conference itself but still wish to contribute. To do so, please reply directly to [ebenyose@post.tau.ac.il](mailto:ebenyose@post.tau.ac.il) with your manuscript title and a short (up to 200 words) abstract. As we hope to produce this volume in a timely manner, please send these details as soon as possible.

Best regards,

Erez Ben-Yosef and Yuval Goren

**More about the conference:**

<http://www.ucl.ac.uk/iams/iams-news-publication/timna-conference-2013>

[http://archaeology.tau.ac.il/wp-content/uploads/2013/04/Timna\\_Conference\\_Booklet\\_2013-s.pdf](http://archaeology.tau.ac.il/wp-content/uploads/2013/04/Timna_Conference_Booklet_2013-s.pdf)

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## *INTERNET SITES*

### ΑΔΡΙΑΝΕΙΟ ΥΔΡΑΓΩΓΕΙΟ

Μια σχετικά συνοπτική αναφορά και παρουσίαση του υπόγειου ρωμαϊκού υδραγωγείου της Αθήνας, για τους φίλους του (νέου)προσωπικού μπλογκ "ΑΣΤΙΚΗ ΣΠΗΛΑΙΟΛΟΓΙΑ" και για όλους τους ενδιαφερόμενους. Η παρουσίαση βασίστηκε σε κείμενα πληροφοριών του κ. Χιώτη και της κ. Νεστορίδη (σας ευχαριστώ ιδιαίτερω για όλα!) και αντικατοπτρίζει τις εξορμήσεις καταγραφής και αποτύπωσης των φρεάτων του υδραγωγείου των τελευταίων μηνών, καθώς και ελάχιστες εσωτερικές επισκέψεις στα τμήματα που είναι προσβάσιμα. Είναι μια προσπάθεια τεκμηριωμένης παρουσίασης των στοιχείων που υπάρχουν, στην οποία εμφανίζονται και οι στόχοι της ΕΥΔΑΠ για αξιοποίηση του έργου, καθώς και η επερχόμενη μελλοντική υπόγεια εξερεύνηση - αποτύπωσή του για εκπλήρωση των στόχων αυτών, τροφοδοτώντας ταυτόχρονα και την ύλη του διδακτορικού μου. Καλή ανάγνωση!

**Παρακαλώ επισκεφθείτε το δικτυακό τόπο:**

<http://urbanspeleology.blogspot.gr/2013/06/blog-post.html>

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# **HIGH-RESOLUTION RECORDING: ASHURNASIRPAL II AND TUTANKHAMUN DIGITAL LIBRARY FOR INTERNATIONAL RESEARCH, MIDDLE EAST RESEARCH JOURNALS PROJECT**

## **Factum Foundation**

Factum Foundation is a registered Foundation, established in 2009 and based in Spain, dedicated to the development and use of non-contact high-resolution digital recording as part of a coherent approach to the preservation, understanding and public exhibition of objects from our cultural heritage.

Advances in digital technology are dramatically and radically changing our understanding and appreciation of our shared cultural heritage.

Science and technology are assisting art by providing forensically accurate information to both specialists and an interested public.

The foundation is dedicated to demonstrating that the way we understand the original object is part of a dynamic process and not a fixed state of being. When the dynamic nature of originality is successfully presented, works of art come alive - their complex biographies inform the present and influence the future. When viewed in this way they cease to be discrete objects to be viewed in museums and become complex subjects that can reveal their past (and also reveal how they have been valued and cared for by previous generations in diverse locations). Read more

## **Projects**

Facsimile of the Eastern End of the Throne room of Ashurnasirpal II 2010-2013

Facsimile of the Tomb of Tutankhamun 2009-2013

Please visit the site: <http://ancientworldonline.blogspot.com/2013/06/high-resolution-recording.html>

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## **THE WALL PAINTINGS OF TELL EL DABA**

Dear colleagues,

the homepage of the 'Tell el Dab'a Wall Paintings Project' is finally online under the following link: <http://www.wall-paintings-ted.de/>

It includes some up to now unpublished images and results and aims to provide you in future with information about new outcomes, current projects and publications.

With very best wishes,  
The Tell el Dab'a Wall Painting Team

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## **ASOR ARCHIVES FINDING AIDS ONLINE**

### **The ASOR Archives**

The ASOR archives houses materials documenting a century's worth of ASOR's contributions to archaeology. The archive contains the papers of past ASOR presidents, records created by administrative bodies such as the Board of Trustees, the Executive Committee, and the Committee on Archaeological Policy, full runs of ASOR publications, and materials pertaining to excavations lead or participated in by ASOR.

### **Collections**

The ASOR archive holds over a century of records. This list represents materials that have been, or are in the process of being organized and described. Check back often to see newly-processed collections.

Coll. 001. American Schools of Oriental Research Newsletter Collection This collection contains a full run of the ASOR Newsletters from 1939-1995. The newsletters contain information about ASOR projects, events such as annual meetings and conferences, fundraising efforts, grant awards, and administrative announcements. Back issues from 1996 to the present are available online.

Coll. 002. William Foxwell Albright Papers This collection contains the materials generated by William F.

Albright during his ASOR presidency. The collection spans from 1936-1964, and includes materials from Albright's ASOR presidency. It includes a significant amount of correspondence with other archaeologists and ASOR colleagues regarding research, excavations, new archaeological methods, and logistical aspects of publishing ASOR bulletins, journals, scholarly papers and monographs. Learn more about the collection from the Collection Summary. Learn what is in the collection from the Folder List.

Coll. 003. Ancient Manuscripts Committee Records The Ancient Manuscripts Committee was originally founded as the Dead Sea Scrolls Committee. The majority of the collection is correspondence regarding the study, publication rights, and preservation of the Dead Sea Scrolls, and the funding of the Committee. The records date from 1963 to 1981. Learn more about the collection from the Collection Summary. Learn what is in the collection and browse materials online using the Folder List.

Coll. 004. American Palestine Exploration Society Photograph Collection The Tancrede Dumas Photograph Collection contains photographs of archaeological sites in Palestine and Lebanon. The photographs were taken during the 1875 expedition of the American Palestine Exploration Society. Learn more about the collection from the Collection Summary.

Learn what is in the collection and browse materials online using the Folder List. (Please allow a few moments for the Folder List to load.)

Coll. 006. Board of Trustees Records



The Board of Trustees Collection contains board meeting minutes from 1921-1989. Learn more about the collection from the Collection Summary. Learn what is in the collection from the Folder List.

Coll. 007. Bulletin of the American Schools of Oriental Research Collection The BASOR Collection contains early volumes of the Bulletin, as well as original photographs, article submissions, and other materials published in the Bulletin. The materials date from 1919-1974. Learn more about the collection from the Collection Summary. Learn what is in the collection from the Folder List.

Coll. 008. Committee on Archaeological Policy Records The CAP Records document the committee's activities, such as providing funding and support to affiliated researchers. This collection has not yet been processed.

Coll. 009. American School of Oriental Research in Jerusalem Records, held at the Archaeological Institute of America ASOR began as a subcommittee of the AIA, and ASOR's earliest records are held there. The materials date from 1900 to the early 1920s. This collection is being processed.

Coll. 010. Nelson Glueck Papers

The Nelson Glueck Papers contain the professional correspondence, diaries, and photographs of this eminent biblical archaeologist.

Materials in the collection date from the early 1930s to 2008. Learn more about the collection from the Collection Summary. Learn what is in the collection and browse materials online using the Folder List.

(Please allow a few moments for the Folder List to load.)

Coll. 011. A. Henry Detweiler Papers

The A. Henry Detweiler Papers document Detweiler's years as ASOR president. Learn more about the collection from the Collection Summary. Learn what is in the collection and browse materials online using the Folder List. (Please allow a few moments for the Folder List to load.)

Coll. 012. Carl Kraeling Papers

The Kraeling Papers document Kraeling's years as ASOR president. The collection primarily contains correspondence with ASOR colleagues and archaeologists. Kraeling supported the continued study of the Dead Sea Scrolls, and encouraged humanitarian awareness for Near Eastern refugees during a turbulent period in the area's history. The records span from 1947 to 1955. Learn more about the collection from the Collection Summary. Learn what is in the collection and browse materials online using the Folder List. (Please allow a few moments for the Folder List to load.)

Coll. 013. Tell el-Kheleifeh Excavation Records The Tell el-Kheleifeh Excavation Records document the ASOR excavation directed by Nelson Glueck from 1938 to 1940. The records include level books, artifact registries, excavation diaries, and photographs. Learn more about the collection from the Collection Summary. Learn what is in the collection and browse materials online using the Folder List.

Coll. 014. Khirbet et-Tannur Excavation Records The Khirbet et-Tannur Excavation Records document the 1938 excavation of a Nabataean temple. The excavation was directed by Nelson Glueck.

The collection includes level books, excavation diaries, artifacts, and photographs. Learn more about the collection from the Collection Summary. Learn what is in the collection and browse materials online using the Folder List.

Coll. 015. Edmund Irwin Gordon Papers

This collection documents the life and career of Edmund Gordon. Gordon was a scholar of Near Eastern languages. He served in WWII as a signal intelligence specialist, and later studied at the ASOR Jerusalem School. The collection spans 1934-1984. Learn more about the collection from the Collection Summary. Learn what is in the collection from the Folder List. (Please allow a few moments for the Folder List to load.)

Coll. 016 ASOR Jerusalem School Collection This collection contains financial documents, ledgers, correspondence, as well as legal materials. All pertain to the administration of the school. The collection also contains artifact drawings and photographs of the many excavations affiliated with ASOR. Learn more about the collection from the Collection Summary. Learn what is in the collection from the Folder List.

Coll. 017 Shechem Excavation Records

This collection contains administrative and financial records, correspondence, site reports, field notes, artifact registries, top plans, pottery drawings, and photographs of the site and artifacts found there. Additionally, the collection includes a manuscript of Shechem: The Biography of a Biblical City by G. Ernest Wright, as well as an operetta about the excavation that was written and performed by participants in the 1962 excavation season. Learn more about the collection from the Collection Summary. Learn what is in the collection and browse materials online using the Folder List.

Coll. 018. G. Ernest Wright Papers

The G. Ernest Wright Papers span from 1957-1972. The collection primarily contains correspondence documenting ASOR administration, the founding of the journal Biblical Archaeologist, Wright's participation in the Shechem excavation, and his service as visiting archaeological director of Hebrew Union College. Wright was elected ASOR president in 1965, and worked with the organization until his death in 1974. Learn more about the collection from the Collection Summary. Learn what is in the collection from the Folder List. (Please allow a few moments for the Folder List to load.)

Coll. 019. Diban Excavation Records

This collection documents the excavation of Diban in Jordan by Frederick V. Winnett from 1950-1965. The collection contains photographs, correspondence, and artifact registries. Learn more about the collection from the Collection Summary. Learn what is in the collection from the Folder List.

Coll. 020. Clarence Fisher Papers

This collection primarily documents Fisher's academic and professional life. The collection contains his exhaustive pottery corpus, writings, architectural and artifact sketches, correspondence, creative writing, and excavation diaries. The bulk of the

materials pertain to the analysis of Near Eastern pottery. The materials date from 1859-1957.

Coll. 021. Issawiya Tomb Excavation Records This collection documents the excavation of a Herodian tomb discovered underneath a field on the hillock of Ras el Jami in Issawiya, a neighborhood of Jerusalem just north of Mount Scopus. The collection contains photographs and journals, and a diary kept by Carl Graesser. The collection spans 1970-1995. Learn more about the collection from the Collection Summary. Learn what is in the collection and browse materials online using the Folder List.

Coll. 022 Jerash Excavation Records

The collection contains primarily photographs and correspondence documenting different areas of the excavation. Two sketchbooks include detailed architectural drawings and some journal entries. The General file has an excavation report. With this collection is a wood printing plate of the site map. The materials date from 1928 to 1952. Learn more about the collection from the Collection Summary. Learn what is in the collection and browse materials online using the Folder List.

Coll. 023 Biblical Archaeologist / Near Eastern Archaeology Collection This collection contains Biblical Archaeologist and Near Eastern Archaeology, magazines published by ASOR. The magazines contain scholarly articles, field notes, book reviews, and photographs all pertaining to the art, archaeology and history of the cultures of the ancient Near East. Learn more about the collection from the Collection Summary. Learn what is in the collection from the Folder List.

Coll. 024 Journal of Cuneiform Studies Collection This collection contains published journals between 1951 and 2009 with some gaps. Learn more about the collection from the Collection Summary. Learn what is in the collection from the Folder List.

Coll. 025 Dhahr Mirzbaneh Excavation Records This collection contains the original manuscript of Paul Lapp's book, The Dhahr Mirzbaneh Tombs: Three Immediate Bronze Age Cemeteries in Jordan (1966), along with the figures and plates used in its creation. The collection also includes notes and drawings by architect David Voelter. Learn more about the collection from the Collection Summary. Learn what is in the collection from the Folder List.

Coll. 026 Nippur Excavation Photograph Collection This collection includes over 300 cyanotype photographs depicting artifacts, architecture, and scenes of excavation work from the Nippur Excavations of the University of Pennsylvania covering 1888-1900. In addition to their archaeological interest, the images are notable for their portrayal of the lives of the Arab laborers who worked on the excavation. Learn more about the collection from the Collection Summary. Learn what is in the collection from the Folder List.

Coll. 027 The Nelson Glueck Photograph Collection This collection contains a photograph index compiled for Glueck's research. The photographs documents hundreds of sites. Many, but not all of the photographs were taken by Glueck. Learn more about the collection from the Collection Summary. Learn what is in the collection and browse

materials online using the Folder List. (Please allow a few moments for the Folder List to load.)

Coll. 028 Subject File

This collection contains miscellaneous materials organized alphabetically by subject. Learn what is in the collection and browse materials online using the Folder List. (Please allow a few moments for the Folder List to load.)

Coll. 029 ASOR Excavation Records

This collection is comprised of grant applications, correspondence, financial records, newsletters, budgets, publications, reports, account books, and photographs from a number of ASOR affiliated excavations. Learn more about the collection from the Collection Summary. Learn what is in the collection from the Folder List.

Coll. 030 ASOR Glass Plate Negative Collection This collection contains glass plate negative photographs from Beth El, Beth Zur, Tel Beit Mirsim, and Tel el Ful. The photos were taken between 1932 - 1935. Learn more about the collection from the Collection Summary. Learn what is in the collection from the Folder List.

Coll. 032 Agency for International Development Collection This collection contains information about ASOR's relationship with the Agency for International Development (AID). The content includes correspondence, financial documents, grant proposals, and reports.

Learn more about the collection from the Collection Summary. Learn what is in the collection from the Folder List.

**Please visit the site: <http://ancientworldonline.blogspot.com/2010/07/asor-archives-finging-aids-online.html> [Go there for links]**

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## ***ΝΕΕΣ ΕΚΔΟΣΕΙΣ – NEW PUBLICATIONS***

### **STRANGE CHARACTERS - AN ARCHITECT WORKING IN HIS SPARE TIME BESTED EXPERTS IN CLASSICS, LINGUISTICS AND ARCHAEOLOGY IN DECIPHERING AN ANCIENT SCRIPT, BY JONATHAN LOPEZ**

The Riddle of the Labyrinth

By Margalit Fox

(Ecco, 363 pages, \$27.99)

The race to decipher Linear B—an ancient writing system discovered on a set of clay tablets at Knossos on Crete in 1900—was one of the great intellectual adventure stories of the 20th century. Some of the finest minds in linguistics, classics, archaeology and other disciplines vied to crack the code of this hitherto unknown script, whose spindly, serpentine characters constituted the earliest example then known of writing in Europe. In a remarkable turn of events, the victor was a talented amateur named Michael Ventris, an architect by profession, who had been fascinated by the puzzle of Linear B since childhood.

Besting the many experts with whom he corresponded and shared notes, he announced his decryption of the tablets to great acclaim in 1952.

Chronicling the entire Linear B saga from discovery to decipherment, "The Riddle of the Labyrinth," by New York Times reporter Margalit Fox, purports to overturn the accepted version of events and shift the limelight substantially away from Ventris. Long interested in the Knossos tablets, Ms. Fox, who holds a degree in linguistics, discovered that "the story I knew—the only story anyone knew—was incomplete. A major actor in the drama was missing: an American woman named Alice Elizabeth Kober."

A classics professor at Brooklyn College, Kober carried out a substantial portion of the linguistic analysis that made Ventris's decipherment of Linear B possible. Had she not died prematurely in 1950 at the age of 43, she might, Ms. Fox contends, have hit upon the solution herself. Lamenting in a tone of principled outrage that Kober is "all but forgotten today," Ms. Fox likens her to another "unsung heroine" in the intellectual realm, the English scientist Rosalind Franklin, who was largely written out of the history of DNA research in favor of her male peers.

Unfortunately, Ms. Fox's claims about the neglect of Kober's legacy are exaggerated to the point of being misleading. "The Story of Archaeological Decipherment" (1975), by the British classicist Maurice Pope, is an authoritative survey of hieroglyphics, cuneiform and other ancient scripts decoded by modern researchers. Chapter Nine is devoted to the Knossos tablets and is titled "Kober, Ventris and Linear B"—amply demonstrating that Kober is neither unknown nor unsung in the standard histories. The very first (and still the best) book on the subject, "The Decipherment of Linear B" (1958), by Michael Ventris's friend and collaborator, the Cambridge University classics professor John Chadwick—Ventris himself died in an auto accident in 1956—clearly states that "Kober

would have taken a leading part in the events of later years, had she been spared; she alone of the earlier investigators was pursuing the track which led Ventris ultimately to the solution of the problem."

As Chadwick points out, a crucial factor in Ventris's decipherment of Linear B was his talent for collegiality. In 1949, just before the 50th anniversary of the excavation of Knossos, Ventris sent a questionnaire to the major figures in the field asking their opinions about the basic problems they faced in making sense of the tablets.

Ventris then copied (and, when necessary, translated) the responses, circulating what he called his "Mid-Century Report" to the entire group—who continued to respond and to whom he continued to send updates or "Working Notes"—a distant precursor to today's academic Listservs or FacebookFB -0.60% groups.

Ventris corresponded eagerly with Kober, who rebuffed his initial inquiries but eventually warmed up, and thereby came to understand her analysis of the inflection pattern in Linear B—the way in which a word is modified to indicate its grammatical function (e.g., "work," "working," "worked"). Kober's analysis led Ventris to deduce that the language of the tablets must be an archaic form of Greek. (Most researchers had thought it more likely to be a variant of Hittite, an Indo-European language spoken in Asia Minor during the second century B.C., while Ventris himself had conjectured that it was Etruscan.) From the Yale University professor Emmett L. Bennett Jr., Ventris gained an understanding of the morphological structure behind the individual Linear B characters, which Bennett grouped according to an intricate system of signs and variants. And yet, Ventris's ultimate solution involved a measure of inspired guesswork. "Ventris was able to discern among the bewildering variety of the mysterious signs," writes Chadwick, "patterns and regularities which betrayed the underlying structure."

There might have been value in updating Chadwick's eloquent but slightly old-fashioned book if Ms. Fox offered a swift and stylish retelling of the story, but unfortunately she doesn't. Her writing is at times careless, and the narrative struggles to get from point A to point B without becoming mired in contradictions. Describing Alice Kober delivering a public lecture on June 15, 1946, Ms. Fox notes that, "although few people knew it, she was the world's foremost expert on Linear B"—but a few pages later she informs us that two months before the lecture, the nation's major newspapers had already announced that Kober had won a Guggenheim Fellowship for her work on Linear B, eliciting plaudits from colleagues around the globe. One cannot help thinking that an editor ought to have expunged this logical inconsistency—and numerous infelicities of expression with it. Early on, Ms. Fox describes spoken language "evolving hot on the heels, evolutionarily speaking, of the dawn of man." The dawn of man had heels?

The history of Linear B is fascinating, and Kober deserves a prominent place in it, but there is no need to suggest that blinkered prejudice or scholarly conspiracy has kept her in obscurity. Ms. Fox's bumpy retelling of the story turns out to be a riddle in itself—one unworthy of its subject.

**Please visit the site:**

<http://online.wsj.com/article/SB10001424127887324266904578456630838027130.html>

## **EΙΔΗΣΕΙΣ - NEWS RELEASE**

# **THE ANCIENT ROMANS WERE BETTER AT MAKING SUSTAINABLE CONCRETE THAN WE ARE, BY JASON KOEBLER**

An ancient concrete mixture could be better for the environment and just as strong as modern mixtures

The secret to making sustainable, strong concrete may have been at the bottom the Mediterranean Sea for the past 2,000 years: Researchers believe that the ancient Romans created concrete that is more environmentally friendly and durable than modern cement.

Concrete is one of the most commonly used building materials in the modern world, but its role in creating carbon emissions is often overlooked. Worldwide, some 19 billion tons of concrete is used annually, and the high temperatures necessary to produce it are responsible for up to 7 percent of all human carbon dioxide emissions.

"It's a beautiful material, it's used all over the world, but the weakness is we use too much of it. We cannot continue with business as usual," says Paulo Monteiro, a researcher at the U.S. Department of Energy's Lawrence Berkeley National Laboratory. His findings were published in the Journal of the American Ceramic Society. "We have to find alternative ways to make concrete."

Monteiro and his colleagues may have found an alternative: "sea" concrete used by Romans for harbor installations in the Mediterranean is made with a different concentration of materials than today's mix of limestone and clay, which allowed it to be baked at a much lower temperature (about 1,650 degrees, compared to 2,640 degrees for modern "Portland" concrete). The result is a strong concrete that is less harmful to the environment.

Engineers have had some success using the byproducts of coal power plants, known as "fly ash" to create a type of "green" concrete, but there is only so much fly ash to go around, Monteiro says. So engineers may soon do as the Romans did and use a mix of volcanic ash and limestone.

"Volcanic ash is available in a good deal of the world, usually there are entire mountains of it following a volcanic eruption," he says.

"The Romans were unbelievably good at using it as a building material."

Archaeologists have long known the Roman formula for creating this type of concrete, but it wasn't until recently that Monteiro and his team discovered that ancient concrete is about as durable as present mixtures. The Romans' mixture does have several drawbacks: It takes several weeks of setting to reach its full strength potential, which makes it difficult to use for projects such as dams or bridges. But its longevity, Monteiro says, is obvious.

"They wanted a concrete that could last forever," he says. "They were practical and good engineers, and from the ruins you can see it has long-term durability."

Please visit the site: <http://www.usnews.com/news/articles/2013/06/04/the-ancient-romans-were-better-at-making-sustainable-concrete-than-we-are>

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## **WHEN DID THE FRENCH START MAKING WINE? BY STUART FOX**

A new study finds evidence that ancient Gauls began wine production in 425 B.C. in the Languedoc

Dom Pérignon, Pétrus, Domaine de la Romanée-Conti—the roots of these iconic wines and all of French wine culture may lie in a simple stone press, according to new scientific research. Uncovered in the Mediterranean town of Lattes, just south of Montpellier, the roughly 2,400-year-old artifact was originally identified by archaeologists as an olive-oil press. But a new round of chemical and archaeological analysis now identifies the press as the earliest evidence of wine production in France.

The analysis, headed by Patrick McGovern, the scientific director of the Biomolecular Archaeology Laboratory at the University of Pennsylvania Museum of Archaeology and Anthropology, and reported in the current issue of the Proceedings of the National Academy of Sciences, uses an array of evidence to not only hypothesize when the French started making wine, but who originally taught them how to do it.

"The question was whether it was an oil press or a wine press, and we proved that it is the oldest wine press in France through chemical analysis," McGovern told Wine Spectator. "There's still the question of how the transfer of viticulture occurred, and what we showed here is that at least for southern France, it's the Etruscans who are enticing the Celts or the Gauls into the wine market. Then it spreads up the Rhône and eventually establishes what is today's primary wine culture."

According to McGovern, the evolution of French wine production proceeded in phases. First, ancient Mediterranean civilizations such as the Phoenicians, Greeks and Etruscans began selling goblets and wine to the native Gauls. Then, as indicated by the stone press, the Gauls cut out the middle man and established native wine production around 425 B.C.

The archaeological site surrounding the press supports the theory that trade and production went hand in hand. The earliest wine-related artifacts at the site consist of clay containers brought by Greek and Etruscan traders for sale to the native Gauls. A century or so later, local wine production, as indicated by the press, had emerged side by side with trading. "[The Celts and Gauls] imported some very fancy wine sets, made of gold or bronze, that showed off how wealthy you were," said McGovern. "And if you're going to import the wine vessels, you might get interested in making the wine yourself."

To test the previous theory that the press produced olive oil, McGovern and his team utilized a mixture of chemical and archaeological evidence. Through the chemical tests, the researchers identified wine-specific compounds in the limestone of the press and then matched those compounds to residue found in nearby clay jars known to have contained ancient wine. Researchers also found grape seeds buried beside the press and identified structurally similar presses in ancient Etruscan paintings of wine production.

Although 425 B.C. sounds ancient, it's at roughly the same time as the life of Socrates. The new discoveries imply that France came to the winemaking game rather late. Traders from modern-day Israel and Lebanon brought knowledge of wine from the Mideast to North Africa, Greece, Spain and Italy hundreds of years before the French established their first winery. Those Gauls do seem to have made up for lost time, however.

Please visit the site: <http://www.winespectator.com/webfeature/show/id/48516>

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## **NEW ARCHAEOLOGICAL 'HIGH DEFINITION' SOURCING SHARPENS UNDERSTANDING OF THE PAST**

A new method of sourcing the origins of artefacts in high definition is set to improve our understanding of the past.

Dr Ellery Frahm at the University of Sheffield developed the new technology to better study Mesopotamian obsidian tools unearthed in Syria, where cultural heritage is threatened by the ongoing conflict.

The research brings five decades of research full circle and presents a significant advance in the field. While at the University of Sheffield from 1965 – 1972, Professor Lord Colin Renfrew developed a technique that matched stone tools made of obsidian, naturally occurring glass, to their volcanic origins based on their chemical fingerprints.

Considered one of the greatest successes in scientific archaeology, matching artefacts to specific volcanoes was a significant leap forward in understanding trade, contact, and cultural change in the ancient world.

Nearly 50 years later, Dr Frahm's work is the next major advance in obsidian sourcing. Previously it was only possible to match an artefact to a particular volcano or lava flow, sometimes covering dozens of chemically uniform square kilometres.

Frahm's new approach builds on traditional methods with additional magnetic analyses. The magnetic properties of obsidian vary on the scale of meters, not kilometres, enabling researchers to match an artefact to a particular quarry at the volcano. The result is much greater specificity of an artefact's origin, enabling human behaviours in the past to be reconstructed with greater spatial resolution than previously possible.

"Sourcing artefacts in this way gives us a sharper picture of the past," explained Frahm. "We have already used this approach to show how obsidian was collected from certain quarries at volcanoes and how ancient quarrying locations change over time.

This approach provides a deeper insight into our understanding of past human behaviour and will hopefully enhance research into how different groups managed natural resources linked to their economies."

Indeed, one of the most important aspects of the study for Dr Frahm and his collaborator, Dr Joshua Feinberg at the University of Minnesota, was the simplicity of the approach and how widely applicable it will be. "Our magnetic tests were chosen in part for their simplicity so that most rock magnetism laboratories could take the necessary measurements and apply this new approach worldwide. We did not want to develop a technique that could only be done in one or two laboratories in the world. It was important the approach be accessible, making it as 'open source' as possible."

Development of this approach partly depended on the sheer quantities of specimens and artefacts studied, "This study involved more magnetic measurements of obsidian than all previously published studies combined," explained Frahm. "The resulting picture revealed how to identify quarries of particular importance to Mesopotamian peoples, and it helps us to piece together their cultural significance."

The cultural significance of artefacts to Syria's heritage, which is under threat due to the current conflict, is an important part of Frahm's research. "During my fieldwork in Syria, I identified some spectacular artefacts that should be curated and displayed to the Syrian public at the Deir ez-Zor archaeological museum.

"Unfortunately, Deir ez-Zor has been a centre of fighting since summer 2011. The last time I had an update, the museum had become a stronghold for the Syrian military, even with snipers on the roof, and it appears that when they pulled out last fall, the museum was essentially trashed. This has a doubly damaging effect on the country.

Not only do many Syrians see archaeological sites and artefacts as part of their heritage, but also archaeological excavations put money into the local economy and employ local workers, helping people in rural villages make ends meet. Protecting Syrian heritage throughout this terrible conflict is an issue that needs attention from people who are in a position to help."

Source: University of Sheffield

**Please visit the site:**

**[http://www.sciencecodex.com/new\\_archaeological\\_high\\_definition\\_sourcing\\_sharpe\\_ns\\_understanding\\_of\\_the\\_past-112644](http://www.sciencecodex.com/new_archaeological_high_definition_sourcing_sharpe_ns_understanding_of_the_past-112644)**

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## **BULGARIA'S 2013 SEASON UNDERWAY** **WITH NEW DISCOVERIES**

The archaeology season for Bulgaria is underway, with 2013 already seeing new discoveries.

Among these are the finding of a prehistoric sanctuary near the Via Diagonalis Roman road site and a new dating of the Cape Akra, now believed to be from the time of Trojan War.

The projects underway this year include a study of the ancient city of Heraclea Sintica, near the temple of Vanga, the Bulgarian reputed to have been a prophetess. The team carrying out this project includes 12 students from the United States. The Bulgarians in the team include Dr Lyudmil Vagalinski of the National Institute of Archaeology, Dr Sirma Alexandrova, Dr Ivo Tcholakov and the director of the Petrich museum, Sotir Ivanov.

The team worked on the project in July and August 2012 but suspended work because of the heat. The project, a joint one by the Petrich Museum, the American Research Center and the National Architectural Institute, is mainly US-funded. The American partner is the American Research Center in Sofia, represented by Dr. Emil Nankov; sponsorship of the project is provided by ARCS with the support of the America for Bulgaria Foundation.

Among the first tasks of the team were repairs to signs in Bulgarian and English that had been smashed by vandals.

In the past few years, a number of valuable artifacts have been found at the site, some of which are already on display at the Petrich Museum.

Finds date from the period between the fourth century BCE to the fifth century CE. Items found include catapult stones, theatre masks, terracotta figures, a votive plate with the image of Nemesis, arrows and a coin with the image of Roman emperor Marcian Flavius.

The archaeologists working on the site hope that this year they will be able to find the remains of a theatre, a forum and other public buildings.

At the Via Diagonalis site, near Svilengrad, a prehistoric sanctuary was found. The site has, over time, yielded artifacts ranging from the late Neolithic, Bronze Age, Iron Age and the era of the Roman Empire.

The late Neolithic sanctuary site, said to date from 5200 to 4900 BCE, was used for religious rituals and is close to a spring, an important element in ancient beliefs related to fertility and conception, with the water seen as emanating from the Mother Goddess. Rituals dedicated to the Mother Goddess were performed for fertility and protection of the new harvest.

Items found at the site include pottery for ritual meals and other cult objects. Horns of wild and domestic animals were found.

“The deer is a symbol of male potency and burying him in the womb of the Mother Goddess had meaning,” Professor Valentin Nikolov said.

The stretch of the Via Diagonalis being examined is part of the road that linked Central Europe to Constantinople during the Roman and Late Roman era. Archaeologists have traced it as far to four km to the Kapitan Andreevo border checkpoint with Turkey.

On June 10, it emerged that examination of the Cape Akra site was several centuries older than initially had been believed, and it is now seen as dating from the time of the Trojan War.

In April and May, the archaeological team led by Dr Ivan Hristov found pottery of ancient Greek and Roman origin.

Hristov said that the team had found five ritual sites which Thracians may have used to pay tribute or offer animal sacrifices to the gods.

The discoveries gave a new perspective on the site, earlier seen as dating from the sixth century. Finds of pottery were similar to those found at a Thracian site in the Strandzha area, he said.

In Plovdiv, excavation work at the site next to the central post office is expected to begin in the week starting June 17.

The site is being substantially expanded to the east and north. In 2012, there were a number of significant finds from the layers from the Roman era being exposed.

Archaeologists expect to find a larger portion of a street leading to the western gates of the ancient square. The budget for archaeological work at the central Plovdiv site this year is 400 000 leva, double the funds provided in the 2012 budget.

The city’s mayor, Ivan Totev, told local media that plans continued to be to re-create a link between the Odeon Square and the Forum. This would restore the link that existed between the two about 2000 years ago, and plans were to bring the site up to the standards of the Roman Stadium elsewhere in Plovdiv, which has become a popular tourist drawcard.

**Please visit the site: <http://sofiaglobe.com/2013/06/14/archaeology-bulgarias-2013-season-underway-with-new-discoveries/>**

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## **ANCIENT ROMAN CONCRETE IS ABOUT TO REVOLUTIONIZE MODERN ARCHITECTURE**

After 2,000 years, a long-lost secret behind the creation of one of the world’s most durable man-made creations ever—Roman concrete—has finally been discovered by an international team of scientists, and it may have a significant impact on how we build cities of the future.

As anyone who’s ever visited Italy knows, the ancient Romans were master engineers. Their roads, aqueducts, and temples are still holding up remarkably well despite coming under siege over the centuries by waves of sacking marauders, mobs of tourists, and the occasional earthquake. One such structure that has fascinated geologists and engineers throughout the ages is the Roman harbor. Over the past decade, researchers from Italy and the U.S. have analyzed 11 harbors in the Mediterranean basin where, in many cases, 2,000-year-old (and sometimes older) headwaters constructed out of Roman concrete stand perfectly intact despite constant pounding by the sea.

The most common blend of modern concrete, known as Portland cement, a formulation in use for nearly 200 years, can’t come close to matching that track record, says Marie Jackson, a research engineer at the University of California at Berkeley who was part of the Roman concrete research team. “The maritime environment, in particular, is not good for Portland concrete. In seawater, it has a service life of less than 50 years. After that, it begins to erode,” Jackson says.

The researchers now know why ancient Roman concrete is so superior. They extracted from the floor of Italy’s Pozzuoli Bay, in the northern tip of the Bay of Naples, a sample of concrete headwater that dates back to 37 B.C. and analyzed its mineral components at research labs in Europe and the U.S., including at Berkeley Lab’s Advanced Light Source. The analysis, the scientists believe, reveals the lost recipe of Roman concrete, and it also points to how much more stable and less environmentally damaging it is than today’s blend.

That’s why the findings, which were published earlier this month in the *Journal of the American Ceramic Society* and *American Mineralogist*, are considered so important for today’s industrial engineers and the future of the world’s cities and ports. “The building industry has been searching for a way to make more durable concretes,” Jackson points out.

Another remarkable quality of Roman concrete is that its production was exceptionally green, a far cry from modern techniques. “It’s not that modern concrete isn’t good—it’s so good we use 19 billion tons of it a year,” says Paulo Monteiro, a research collaborator and professor of civil and environmental engineering at the University of California, Berkeley. “The problem is that manufacturing Portland cement accounts for 7 percent of the carbon dioxide that industry puts into the air.”

The secret to Roman concrete lies in its unique mineral formulation and production technique. As the researchers explain in a press release outlining their findings, “The Romans made concrete by mixing lime and volcanic rock. For underwater structures, lime and volcanic ash were mixed to form mortar, and this mortar and volcanic tuff were packed into wooden forms. The seawater instantly triggered a hot chemical reaction. The lime was hydrated—incorporating water molecules into its structure—and reacted with the ash to cement the whole mixture together.”

The Portland cement formula crucially lacks the lime and volcanic ash mixture. As a result, it doesn’t bind quite as well when compared with the Roman concrete, researchers found. It is this inferior binding property that explains why structures made of Portland cement tend to weaken and crack after a few decades of use, Jackson says.

Adopting the materials (more volcanic ash) and production techniques of ancient Roman could revolutionize today’s building industry with a sturdier, less CO<sub>2</sub>-intensive concrete. “The question remains, can we translate the principles from ancient Rome to the production of modern concrete? I think that is what is so exciting about this new area of research,” Jackson says.

Of course, if you are no fan of concrete architecture, you’re out of luck. It could be with us for a few millenia more.

**Please visit the site: <http://www.businessweek.com/articles/2013-06-14/ancient-roman-concrete-is-about-to-revolutionize-modern-architecture>**

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## **MYSTERIOUS MONUMENT FOUND BENEATH THE SEA OF GALILEE**

TAU research says unique structure is the product of skilled construction

The shores of the Sea of Galilee, located in the North of Israel, are home to a number of significant archaeological sites. Now researchers from Tel Aviv University have found an ancient structure deep beneath the waves as well.

Researchers stumbled upon a cone-shaped monument, approximately 230 feet in diameter, 39 feet high, and weighing an estimated 60,000 tons, while conducting a geophysical survey on the southern Sea of Galilee, reports Prof. Shmulik Marco of TAU's Department of Geophysics and Planetary Sciences. The team also included TAU Profs. Zvi Ben-Avraham and Moshe Reshef, and TAU alumni Dr. Gideon Tibor of the Oceanographic and Limnological Research Institute.

Initial findings indicate that the structure was built on dry land approximately 6,000 years ago, and later submerged under the water.

Prof. Marco calls it an impressive feat, noting that the stones, which comprise the structure, were probably brought from more than a mile away and arranged according to a specific construction plan.

Dr. Yitzhak Paz of the Antiquities Authority and Ben-Gurion University says that the site, which was recently detailed in the International Journal of Nautical Archaeology, resembles early burial sites in Europe and was likely built in the early Bronze Age. He believes that there may be a connection to the nearby ancient city of Beit Yerah, the largest and most fortified city in the area.

### **Ancient structure revealed by sonar**

The team of researchers initially set out to uncover the origins of alluvium pebbles found in this area of the Sea of Galilee, which they believe were deposited by the ancient Yavniel Creek, a precursor to the Jordan River south of the Sea of Galilee. While using sonar technology to survey the bottom of the lake, they observed a massive pile of stones in the midst of the otherwise smooth basin.

Curious about the unusual blip on their sonar, Prof. Marco went diving to learn more. A closer look revealed that the pile was not a random accumulation of stones, but a purposefully-built structure composed of three-foot-long volcanic stones called basalt. Because the closest deposit of the stone is more than a mile away, he believes that they were brought to the site specifically for this structure.

To estimate the age of the structure, researchers turned to the accumulation of sand around its base. Due to a natural build-up of sand throughout the years, the base is now six to ten feet below the bottom of the Sea of Galilee. Taking into account the height of the sand and the rate of accumulation, researchers deduced that the monument is several thousand years old.

### **Looking deeper**

Next, the researchers plan to organize a specialized underwater excavations team to learn more about the origins of the structure, including an investigation of the surface the structure was built on.

A hunt for artefacts will help to more accurately date the monument and give clues as to its purpose and builders. And while it is sure to interest archaeologists, Prof. Marco says that the findings could also illuminate the geological history of the region.

"The base of the structure — which was once on dry land — is lower than any water level that we know of in the ancient Sea of Galilee.

But this doesn't necessarily mean that water levels have been steadily rising," he says. Because the Sea of Galilee is a tectonically active region, the bottom of the lake, and therefore the structure, may have shifted over time. Further investigation is planned to increase the understanding of past tectonic movements, the accumulation of sediment, and the changing water levels throughout history.

**Please visit the site: <http://www.aftau.org/site/News2?page=NewsArticle&id=18649>**

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## **KAZAKHSTAN ARCHAEOLOGISTS DISCOVER SAKA PRINCESS TOMB**

Kazakhstan archaeologists found a tomb of a “Saka princess”, Tengrinews.kz reports citing head of the expedition Timur Smagulov.

The burial site of the high-ranking young woman was discovered during reconstruction of Taskesken-Bakty road in Urdzhar region of East-Kazakhstan oblast. An expedition made of professors and students of Semipalatinsk and Pavlodar pedagogical institutes discovered the stone tomb-chest with remains of the young woman at the depth of 1.7 meters under a burial mound.

The things found in at the burial site certify that the woman was from a distinguished tribe. According to the archaeologists, the golden head wear that looks like Kazakh Saukele (national headgear of women) is the most valuable item for the research. “The pointed golden head wear with zoomorphic ornaments has the top that looks like the arrows and is decorated with a spiral made of golden wire and jewels. A similar head wear used to be part of the official costume of the Saka tribe chieftains. It is quite possible that the woman was a daughter of a king of Saka Tigrakhauda tribe,” Timur Smagulov said.

According to him, it is quite possible that young Tomiris who later became a warrior-queen used to wear a similar head wear. According to the expedition’s members, ceramic and wooden vessels, as well as bones of a sacrificial sheep were also discovered in the tomb. Pieces of blue and green clothes remained on the woman’s remains. Golden earrings and a stone altar were found next to her head.

“According to the preliminary information, the tomb of the “Urdzhar princess” is dated 4th or 3rd century B.C.,” Smagulov said. According to him, a similar tomb discovered in Issyk burial mound (the “Golden Man”).

For more information

see: <http://en.tengrinews.kz/science/Kazakhstan-archaeologists-discover-Saka-princess-tomb-19862/>

Use of the Tengrinews English materials must be accompanied by a hyperlink to en.Tengrinews.kz

**Please visit the site: <http://en.tengrinews.kz/science/Kazakhstan-archaeologists-discover-Saka-princess-tomb-19862/> [Go there for pix]**

## **BEHEADED SKELETON DISCOVERED NEXT TO SAKA PRINCESS'S TOMB**

Kazakhstan archaeologists have discovered a beheaded human skeleton next to the tomb of the “Saka princess”, Tengrinews.kz reports.

A famous restorer Krym Altynbekov has arrived to the archaeological site to prepare the remains for transportation to a laboratory in Almaty for further study. After the tests the anthropologists will be able to date the burial site more precisely.

According to the archaeologists, another tomb was discovered next to the tomb-chest. It contained a beheaded human skeleton without the right hand. The experts supposed that this could be a sacrifice place but stressed that it was only a guess. Besides, the scientists said that the second body was buried quite carelessly and was merely covered with rocks. It is quite possible that it was done intentionally to confuse potential tomb raiders.

According to the experts, the burial itself is dated around 3-4 century B.C.. It was discovered during an archaeological check made before reconstruction and repairs of a local road. The remains of the “princess” were only several meters away from the road.

The discovery is valuable, according to the archaeologists, because the remains are well preserved and the tomb-chest is intact and in quite a good condition. The discovery was called the “Saka princess” because of a Saukele headgear discovered it in. In its making and appearance it is similar to the one of Issyk’s Golden Man discovered in 1969. Clay and wooden wares containing sheep bones and jewelry were discovered as well. The woman was around 170 cm tall.

The works on cleaning the tomb-chest are being made by Alkei Margulan Archeology Institute. They have only found the remains and the head dress of the “Saka princess” so far. They do not preclude that there are more discoveries on the way.

For more information

see: <http://en.tengrinews.kz/science/Beheaded-skeleton-discovered-next-to-Saka-princesss-tomb-19913/>

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**Please visit the site: <http://en.tengrinews.kz/science/Beheaded-skeleton-discovered-next-to-Saka-princesss-tomb-19913/> [Go there for pix]**

## **APPLICATION OF FACE-RECOGNITION SOFTWARE TO PORTRAIT ART SHOWS PROMISE**

The National Endowment for the Humanities (NEH) has awarded researchers at the University of California, Riverside a \$60,000 grant to continue their development of face-recognition software to help identify unknown subjects of portrait art

A \$25,000 grant in 2012 allowed the research team—Conrad Rudolph, professor of art history; Amit Roy-Chowdhury, professor of electrical engineering; and Jeanette Kohl, associate professor of art history—to begin establishing general parameters of the technology to recognize faces in portrait art. In one example of their success, the software was able to recognize two three-dimensional portraits of the same individual, a death mask and bust of 15th century Italian statesman Lorenzo de' Medici.

In the second phase of the project, "FACES: Faces, Art, and Computerized Evaluation Systems," the researchers will build on their initial successes to study the applicability of automated face-recognition technologies for analyzing portraits under different paradigms, including artist and period styles. They also will continue development of an algorithm robust enough to deal with the problems of angle views, aging and personal artistic style that it can determine the likelihood of a probable match.

"Before the advent of photography, portraits were depictions of people who were important in their own worlds," said Rudolph, the project's principal investigator. "But, as a walk through almost any major museum will show, a large number of these unidentified portraits from before the 19th century—many of them great works of art—have lost the identities of their subjects through the fortunes of time."

Several dozen facial features are used in face recognition technology, Rudolph and Roy-Chowdhury said. Repeated testing and analysis in the first phase of the FACES project indicated that two key categories of information required for identification are local feature similarity, such as the corners of the eyes and the corners of the mouth, and anthropometric distance similarity, such as the width between the eyes and the width of the mouth. The team established 16 points of reference for the former, and 11 for the latter.

"While a lot of work has been done on face recognition in images, the application of this technology to the analysis of portraits provides a host of unique challenges and opportunities," Roy-Chowdhury explained.

"The methods developed need to be invariant to the style of specific artists, appropriate facial features have to be identified, and these need to be done with limited data that can be authenticated by experts like art historians. Once the methodologies have been developed, they can provide an independent and objective input to resolve some long-standing questions regarding the identities of subjects in ancient art works."

Technology that "reads" human faces already must contend with variations in facial expressions, age, facial hair, angle of pose, and lighting, Rudolph said. Refining that

technology to recognize human faces in two- or three-dimensional art—as well as different artist and period styles—introduces further challenges, as does portrait art generally in that the image is not a photographic likeness, but rather one that is a visual interpretation on the part of the artist.

"It looks like you, but better," Rudolph said. "That makes it harder to use face-recognition technology, which doesn't deal with highly subjective images. This is a painstaking process."

During the second phase the researchers will analyze portraits and related material concerned with Dante, the famous Renaissance architect Brunelleschi, Lorenzo de'Medici, Henry VII, Anne Boleyn, Shakespeare, Isaac Newton, and many important papal portraits. They also will test a number of well-known but unidentified Renaissance portraits of women, crypto-portraits and crypto-self-portraits of Renaissance artists Mantegna and Michelangelo, self-portraits by Bernini, and a large body of portraits that seem to show the same Moche (Andes A.D. 100-800) noble throughout the course of his life.

"Many of these images are famous, and many of the identity questions are high-profile and so high-risk," Rudolph said. "Others are less well-known, like the Moche portraits, but are part of important issues in their own fields of study and also may receive a high degree of attention."

For example, the team hopes to examine several portraits that purport to be of Shakespeare and compare them with a portrait art historians know with certainty is the Bard of Avon.

If the refinement of facial recognition software to identify works of art is as successful as the researchers believe it will be, the technology could be used in museums and art conservation laboratories as a standard part of curatorial and preservation practice. It could also be used to recognize variations in architectural details that would reveal new information about building processes, building history, and architectural details, and might also have potential with paleography (ancient writing), possibly allowing the determination of the origin and date of thousands of ancient manuscripts for which identification remains a very subjective matter.

The researchers plan to develop a website and a museum exhibition to demonstrate the use of facial recognition technology to identify portrait subjects.

**Please visit the site: <http://phys.org/news/2013-06-application-face-recognition-software-portrait-art.html>**

## **UNDERGROUND CITY UNEARTHED IN ANATOLIA (ÇORUM)**

During the construction works carried out by the municipality to widen the road, an eight-room underground city has been discovered in the central Anatolian province of Çorum's Boğazkale district. The operator of the construction equipment uncovered a cave-like area and informed the gendarmerie. Then museum officials were called and as a result of examinations, an eight-room underground settlement was reached.

The museum official Önder İpek said they estimated that the settlement was from the Byzantine period and works were stopped in the area to protect the settlement. He said that examinations in the underground settlement would continue and registration works would start soon.

“This area can be open to tourism after the vital security works are done. It is a very wide area and has eight rooms. The widest room is 13x3 meters. A bigger structure including a church can also be found during the works,” İpek said.

Please visit the site: <http://www.hurriyetdailynews.com/eight-room-underground-city-unearthed-in-central-anatolian-province.aspx?pageID=238&nID=48404&NewsCatID=375>

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## **PYRAMIDS OF GIZA BUILT BY TRADE UNIONS OF HIRED WORKERS?**

It is traditionally believed that slaves were the main labor force in the construction of the pyramids of Egypt. However, it is not true, at least in respect of the pyramids located in Giza. Not that long ago, British archaeologist Richard Redding proved conclusively that these wonders of the world were built by free hired workers who even had their own unions.

The scientist suggested another theory of the construction of the ancient Egyptian pyramids. But questions remain. Why did the architects of the Great Pyramids need the outstanding size and exceptional accuracy? Why did they need a huge network of passages and chambers? However, all these questions can be reduced to three simple ones: who built the pyramids of Giza, why and how.

Archaeologist Richard Redding with Kelsey Museum of the University of Michigan believes that one pyramid during the 3rd and 4th dynasties of the Old Kingdom (2600-2100 BCE) took over 20 years to erect, and that eight to ten thousand people were involved in its construction.

According to Redding, the builders were not slaves, and there were no Jews among them. Jews appeared in Egypt much later. In an interview with LiveScience Redding said that the pyramids were erected by young men who were fed well and had access to good-quality health care, because they worked for the good of the society.

It was believed that after his death the king (the word "Pharaoh" appeared a thousand years later) was entitled to sit next to the gods and ask them to help his people, discouraging them from sending epidemics to the country or preventing flooding of the Nile. The pyramids were an important part of the preparation of the king to the heavenly journey.

Builders united in brigades or groups similar to contemporary unions. State officials appealed to the heads of provinces, indicating how many workers should be sent. Each prefecture would send their brigade. A work group had its own name, for example, the Drunkards of Menkaure.

The organization of work and servicing of such a great number of builders demanded maximum efficiency of the bureaucracy, Redding argued. Ancient Egyptians were sticklers for accounting and control.

Numerous papyri were found that reflected meticulous calculations of the amount of consumed bread. Unfortunately, they are silent on the consumption of meat and the pyramid builders' nutrition in general.

Redding made his own calculations. On the basis of current statistical data, he calculated how many calories or grams of protein a person engaged in heavy physical labor should consume. Redding had to make appropriate adjustments because, according to the skeletons, ancient Egyptians were shorter than modern people.



As a result of his calculations, the workers consumed 67 grams of protein a day, or a little more than two McDonald's quarter pounders with cheese. Since the main supplier of protein is meat, every worker ate nearly 6 pounds (2.72 kilograms) of meat per week. The scientist suggested that half of the protein diet was fish from the Nile river and analyzed information about the remains of the ancient Egyptian cattle to calculate how much meat they could get from one animal.

Further calculations showed that 10,000 workers were eating 105 cows and 368 sheep and goats every ten days. To ensure a continuous supply of meat, herds numbering 21,900 cows and 54,750 sheep and goats had to be maintained. They required over a half million square kilometers of grassland, or about five percent of the area of the Nile Delta, and almost 19,000 herders, nearly 2 percent of the country's population.

These data are partially confirmed by archaeological excavations. Redding and his colleagues found and studied 175,000 bones at a construction waste landfill. Half of the bones belonged to large cattle, most of the other half - sheep and goats. The scientists were able to identify up to 10 percent of animal bones. Pig bones were extremely rare.

Researchers drew attention to the remains dated with the time of the assumed emergence of the Giza pyramid, that is, four and a half thousand years ago. It is not known how the animals were brought to the construction site. Redding suggested that the herds were transferred by land, while his colleagues were in favor of the idea that the cattle was transported by river.

Every two years, state officials conducted a census of cows, goats and sheep to promptly take immediate action if necessary. Today, this kind of work is computerized. Workers lived in camps that resembled small villages and huts consisting of 20-40 people and a major administrative center. Food was prepared in centralized kitchens and then delivered to the destination. The higher the position of the employee, the better he was fed.

Redding's theory was supported by a New Zealand Egyptologist Jennifer Hellum with the University of Auckland. She believes that the Egyptian society from the very beginning had a very developed bureaucracy with a dominant hierarchical principle. Hellum said that the Egyptians had the most difficult level of bureaucracy to build a pyramid. They had census, taxation, and centralized government, everything they needed to achieve their goal.

Too high of a price had to be paid for this luxury. Pyramids, in the end, were destroyed by the state. After the 4th dynasty construction of the pyramids came to its end.

Igor Bukker

Please visit the site: [http://english.pravda.ru/science/mysteries/04-06-2013/124743-pyramids\\_giza-0/](http://english.pravda.ru/science/mysteries/04-06-2013/124743-pyramids_giza-0/)

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## **THE ACCIDENTAL ROLE OF COW DUNG IN HISTORY, BY PHILIP BAL**

The production of glazed ceramics in ancient times may have begun thanks to cow pats slipping into the recipe by chance, according to a new theory.

In the absence of anything like real science to guide them, most useful technologies in the ancient world were probably discovered by chance. But that doesn't seem to bode well for understanding how, when and where these often transformative discoveries took place. Can we ever hope to know how, say, the Stone Age became the Bronze Age, or the Bronze Age became the Iron Age?

Thankfully, modern archaeologists are an optimistic and inventive lot.

They figure that, even if the details are buried in the sands of time, we can make some good guesses by trying to reconstruct what the ancients were capable of, using the techniques and materials of the time. Researchers have, for example, built copies of ancient iron- and glass-making furnaces to figure out whether descriptions and recipes from those times really work.

One of the latest efforts now proposes that the production of glazed stones and ceramics – an innovation that profoundly affected trade across the globe – could have been made possible by a vital ingredient in a recipe assembled by serendipity. That possible ingredient? Cow dung.

The earliest glazes, dating from the late fifth millennium BC and found in the Near East, Egypt and the Indus Valley, were used for coating natural stones made from minerals such as quartz and soapstone (talc). As the technology advanced, the stones were often exquisitely carved before being coated with a blue copper-based glaze to make objects now known as faience. By the second millennium BC Egyptian faience was being traded throughout Europe.

Because these copper glazes appear during the so-called Chalcolithic period – the “Copper Age” that preceded the Bronze Age – it has been long thought that they were discovered as an offshoot of the smelting of copper ores such as malachite to make the metal. The glazes are forms of copper silicate, made as copper combines with the silicate minerals in the high temperature of a kiln. These compounds can range from green (like malachite itself, a kind of copper carbonate) through turquoise to rich blue, depending on how much salt (more specifically, how much chloride) is incorporated into the mix. The more of it, the greener the glaze.

Sometimes these copper glazes are crystalline, with regularly ordered arrays of atoms. But they can also be glassy, meaning that the atoms are rather disordered. In fact, it seems likely that copper smelting stimulated not only glazing but the production of glass itself, as well as the pigment known as Egyptian blue, which is a ground-up copper silicate glass. In other words, a whole cluster of valuable technologies might share a common root in the making of copper metal.

### **Fuel speculation**

The basic idea, put forward by Egyptologists such as the Englishman William Flinders Petrie in the early twentieth century, was that other materials might have found their way by accident into copper-smelting kilns and been transformed in the heat. Glass, for instance, is little more than melted sand (mostly fine-grained quartz). To melt pure sand requires temperatures higher than ancient kilns could achieve, but the melting point is lowered if there is some alkaline substance present.

This could have been provided by wood ash, although some later recipes in the Middle East used the mineral natron (sodium carbonate).

How exactly might a blue glaze have been made this way? Another early Egyptologist, Alfred Lucas, who worked with Howard Carter of Tutankhamun fame, proposed that perhaps a piece of quartz used to grind up malachite to make eye-paint found its way into a kiln, where the heat and alkali could have converted residues of the copper mineral into a blue film. But that would make the discovery independent of copper manufacture itself, and it's not obvious how a grinding stone could slip into a kiln. Yet why else should a copper compound come to be on the surface of a lump of quartz?

Last year, Mehran Matin and his daughter Moujan Matin, working at the Shex Porcelain Company in Saveh, Iran, showed that these materials didn't need to be in physical contact at all. All that would require is for a bit of quartz, a ubiquitous mineral in the Middle East, to have been lying around in a copper-smelting kiln.

Or does it? To get the rich turquoise blue, you also need other ingredients, such as salt. So Moujan Matin, now at the Department of Archaeology and Art History at the University of Oxford in England, has undertaken a series of experiments with different mixtures to see if she can reproduce the shiny blue appearance of the earliest blue-glazed stones. She used a modern kiln fired up to the kind of temperatures ancient kilns could generate – between 850 and 980C – in which lumps of quartz were placed on a pedestal above a glazing mixture made from copper scale and other ingredients.

Matin found that copper scale and rock salt alone covered the quartz surface with a rather pale, greenish, dull and rough coating: not at all like ancient blue glaze. An extra ingredient – calcium carbonate, or common chalk, which the Egyptians used as a white pigment among other things – made all the difference, producing a rich, shiny turquoise-blue glaze above 950C.

That looked good – but it forces one to assume that salt, chalk and quartz all somehow got into the kiln along with the copper scale. It's not impossible, but as Matin points out, such accidents probably had to happen several times before anyone took much notice. However, there's no need for the least likely of these ingredients, rock salt.

Matin reasoned that dried cattle dung, which contains significant amounts of both alkalis and salt (chloride), was widely used as a fuel since the beginnings of animal domestication in the eighth millennium BC. So she tried another mixture: copper scale, calcium carbonate and the ash of burnt cattle dung. This too produced a nice, shiny (albeit slightly paler) blue glaze.

Of course, there's nothing that proves this was the way glazing began.

But it supplies a story that is entirely plausible, and narrows the options for what will and won't do the job.

Please visit the site: <http://www.bbc.com/future/story/20130607-the-accidental-role-of-cow-dung/all>

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## **BOSTON HOSPITAL CLEANING 2,500-YEAR- OLD MUMMY**

The mummy known as Padihershef has been on display at the third oldest general hospital in the United States since it received him as a gift from the city of Boston in 1823 as a medical oddity. He is one of the first complete mummies brought to the United States.

A conservator trained in restoring ancient artifacts removed him from his coffin Friday and began using cotton swabs dabbed in saliva to wipe away salt deposits from his face. The salt has been slowly seeping out of his tissue, a result of the mummification process. Experts are also expected to do minor repair and stabilization work on his coffin.

The whole process is expected to take three days.

The mummy and his coffin will then be moved to a special horizontal case in which they will lie next to each other in the Ether Dome, a surgical amphitheater where William T. G. Morton demonstrated the first public surgery using anesthetic on Oct. 16, 1846.

Padihershef was a 40-year-old stonecutter in the necropolis in Thebes, an ancient city on the west bank of the Nile, in what is today's Luxor. He was a gift from a Dutch diplomat who was happy with the city of Boston's hospitality, officials said.

No one knows exactly how he lived or died. Experts are exploring those questions through a conservation project supported by the hospital and donors.

In March, he was removed from his case and transported on a patient stretcher to the imaging suites in the hospital, where technicians subjected him to full body X-ray and CT scanning. Experts were surprised to see a broom handle embedded at the base of his head and running through his torso in what likely was a crude attempt to stabilize his head. There are no records to indicate when the repair was done and by whom, the hospital said on its website.

The study was intended to produce images that could be compared with those gleaned from exams conducted in 1931 and 1976 and to determine the condition of his bones. Those earlier tests revealed his bones had interrupted growth lines that indicate a severe childhood illness that resulted in stunted growth.

**Please visit the site: <http://phys.org/news/2013-06-boston-hospital-year-old-mummy.html> [Go there for pix]**

## **CT SCAN TO SOLVE MYSTERY OF PERTH MUSEUM MUMMY, BY FRANK URQUHART**

THE long hidden secrets of a 3000 year-old Egyptian mummy - one of the star exhibits at a Scottish museum - are set to be finally solved through the use of state of the art CT scans and X-rays.

Perth Museum's ancient Egyptian mummy, believed to contain the remains of a priestess or a princess from Thebes on the banks of the Nile, has been one of the most popular museum exhibits since the historic mummy first went on show in the 1930s after being transferred from the former Alloa Museum.

Until now, the mummified remains inside the ornate sarcophagus have been shrouded in mystery. But today the mummy will start a journey from Scotland to Northern England where experts at the Manchester - based KINH Centre for Biomedical Egyptology will finally begin unlocking the secrets of the ancient mummy at a children's hospital in the city.

As part of the Ancient Egyptian Animal Bio Bank project at the KINH Centre at Manchester University, the mummy is being shipped to the Royal Manchester Children's Hospital where it will undergo both a conventional x-ray and a CT scan for the very first time.

And the experts hope their investigations will begin to uncover details about the mummy's life and death.

Dr Lidija McKnight, from the Ancient Egyptian Animal Bio Bank project, explained: "Non-destructive scientific techniques will be used to study the human mummy in the Perth Museum collection enabling us to better understand how the individual lived and died, including how the body was treated by the embalmers, whilst causing no damage to the mummy itself."

### **Mummy's gender**

She continued: "This is an extraordinary opportunity to X-ray a mummy which has never been studied before, making us the first people to see inside the wrappings since the body was mummified thousands of years ago.

"We hope that by combining modern science and the expertise of the Bio Bank team at the University of Manchester, the Perth mummy will be better understood, promoted and conserved."

Dr McKnight said: "We know the coffin suggests it's a female, so we will check whether it really is a woman. If it's a man, then clearly something has gone awry at some stage over the years.

"We'll try and assess an age - was this an adult, a teenager, or a child? And we should get some suggestion of whether the person had suffered any diseases or injuries.

“And are there any amulets or jewellery incorporated within the bandages? We won’t know until we have a look.”

She added: “We will also look to see how the body was mummified. Were internal organs left in, taken out altogether, or taken out and wrapped and then put back? “Was the brain removed? That may depend on the period in which the body was mummified.”

A spokesman for Manchester University said: “Perth Museum’s 3,000 year old Egyptian mummy has been one of the most popular museum exhibits since she arrived from Alloa Museum in the 1930s. Believed to be either a priestess or a princess from Thebes, the mystery surrounding her life story has kept visitors guessing for years.

He explained that museum collection transport specialists, Constantine, were arriving at Perth Museum today to carefully pack the mummy in to a custom built case and ensure that her journey to Manchester is a smooth one.

The spokesman continued: “ She will be accompanied by the Museum’s History Officer, Mark Hall, who is eager to see the results of the scan. The mummy will return to Perth Museum on 7 June.

“The funding necessary to transport the mummy to Manchester was provided by the Faculty of Life Sciences, University of Manchester, and made possible through collaboration with the Central Manchester University Teaching Hospitals NHS Foundation Trust.”

**Please visit the site: <http://www.scotsman.com/news/odd/ct-scan-to-solve-mystery-of-perth-museum-mummy-1-2957639>**

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## **EXCAVATIONS TO BEGIN IN ANCIENT SEBASTAPOLIS AFTER TWO DECADES**

Tokat's ancient city of Sebastapolis, which has been neglected for 22 years, will once again welcome archaeological excavations, set to begin this month

The ancient city of Sebastapolis, known as one of the five largest cities in the Black Sea 2,000 years ago, was the capital of a number of states in the past. Archaeological excavations will soon begin once again after 22 years.

After a 22-year hiatus, archaeological excavations will begin once again in the ancient city of Sebastapolis in the Central Anatolian province of Tokat's Sulusaray district.

Sulusaray district administrator Yaşar Kemal Yılmaz said Sebastapolis was known as one of the most significant ancient cities in the Central Black Sea and Northeastern Anatolian region.

Yılmaz said the ancient city had been the capital of a number of states in the past. "One of the leading Roman cities, Sebastapolis, is regarded as a 'second Ephesus' by archaeologists and experts. It is a highly significant area. But because of some technical problems and a lack of interest, the excavations that were carried out between 1987 and 1991 were insufficient. The ancient city is in a bad and idle situation. We are doing our best for the protection of ancient pieces there with the help of security forces. Excavations should begin as soon as possible to unearth these works and present them to the world," he said.

Yılmaz added that unearthing the ancient city was also important for Sulusaray district in terms of attracting visitors. "Sebastapolis has strategic importance. The ancient works will shed light on the past.

Once the ancient city is unearthed, the district will be a center of attraction," he said.

Yılmaz said the excavation works would begin this month under the leadership of the Tokat Museum Directorate and the scientific consultancy of Gaziosmanpaşa University History of Department member Associate Professor Şengül Dilek Ful.

### **Ancient city of Sebastapolis**

It is reported in some resources that the ancient city of Sebastapolis was established in the 1st century B.C. The ancient city was included in the Cappadocia region after being separated from the Pontus Galatius and Polemoniacus states at the time of the Roman Emperor Trajan between 98 and 117 A.D. It was known as one of the five largest cities in the Black Sea 2,000 years ago because of the fact that it was located on passageways and thanks to its thermal sources, which are still being used today.

As an indicator of its wealth at the time of the Roman Empire, Sebastapolis had the authority to print money. It is reported that the city lost its importance and was forgotten over time, largely due to big wars, destruction, disasters and changes to passageways.



Please visit the site: <http://www.hurriyetdailynews.com/excavations-to-begin-in-ancient-sebastapolis-after-two-decades.aspx?pageID=238&nID=48330&NewsCatID=375>

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## **THIS CASTLE’S TOILET STILL HOLDS PARASITES FROM CRUSADERS’ FECES**

Cyprus, the Mediterranean island nation just south of Turkey, took centuries to gain its independence. The Greeks, Assyrians, Egyptians, Persians, Romans, Ottomans, British and others all took their turns taking over the island, and each left their mark on the archeological record. But in a ruined chamber in a castle on the western corner of the island, it may be more apt to say the invaders left a smear.

In 1191, during the Third Crusade, King Richard I of England invaded Cyprus and ordered that a castle be built on the island’s western corner in order to defend the harbor there. Called Saranda Kolones, the castle’s name refers to its many monolithic columns. But in typical tumultuous Cyprus fashion, the medieval castle was only used for thirty years before it was destroyed by an earthquake. By then, King Richard had sold Cyprus to Guy de Lusignan, the King of Jerusalem. Lusignan and his successors had other plans for expanding the island. The wrecked port was abandoned and the castle never rebuilt.

As castles go, Saranda Kolones had a pretty poor run. But two University of Cambridge researchers recently realized that, precisely thanks to the castle’s short use, a priceless treasure had been left behind in the Saranda Kolones’ bowels. One of the centuries-old castle latrines (read: ancient toilet), they found, was still full of dried-up poo. That feces, they thought, could provide valuable insight into what kind of parasites plagued the former residents’ guts. And because only 30 years’ worth of waste clogged the ancient sewage system, those parasites could provide specific insight into what ailed medieval crusaders. The researchers rolled up their sleeves and collected samples from the dessicated cesspool.

To rehydrate the ancient night soil, the team placed one gram of their sample into a chemical liquid solution. They used micro sieves, or tiny strainers to separate parasite eggs from the digested remains of the crusaders’ meals. They created 20 slides, and peeked into their microscopes to see what creatures the soldiers may have left behind.

One of the recovered whipworm eggs. Photo by Anastasiou & Mitchell, International Journal of Paleopathology The samples revealed 118 “lemon-shaped” *Trichuris trichiura* eggs—a type of roundworm commonly called the whipworm—as well as 1,179 *Ascaris lumbricoides*, or giant roundworm, eggs. A control sample of non-toilet soil they tested did not contain any parasite eggs, confirming that the eggs did indeed come from the toilet, they report in the International Journal of Paleopathology.

The study of ancient parasites, whether through old bones that reveal leprosy-causing pathogens or dried up leaves that elucidate the cause of the Irish potato famine, is a thriving field. In this case, the long-dead parasite eggs were pooped out by the crusaders using the toilet years ago. These species reproduce within human bodies, and go on to infect new hosts through egg-contaminated soil or food delivered courtesy of the host.

Heavy infection with either of these worms was no picnic. The authors write, first of giant roundworms:

The mature female then starts to lay about 200,000 eggs per day that can be fertile or unfertile if no male worms are present. Although a mild infection with roundworms is mostly asymptomatic, heavy burdens with *Ascaris* can cause intestinal blockage and abdominal pain in adults. Because children are less able to tolerate parasites that compete with them for nutrients in their diet, heavy infection with roundworms can cause nutritional impairment, vitamin deficiencies, anaemia and growth retardation.

And of whipworms:

When the females reach maturity they can release 2000–10,000 eggs per day. As with roundworm a heavy worm burden may contribute to malnutrition, stunted growth in childhood and sometimes mechanical damage of the intestinal mucosa, diarrhoea and prolapsed rectum.

The presence of these worms, the authors write, attests to the poor hygienic conditions the castle residents likely practiced and put up with. “Poor hygiene with dirty hands, contamination of the food and water supplies with faecal material, inadequate disposal of the faecal material, and consumption of unwashed vegetables fertilized with human faeces are some of the means through which roundworms and whipworms are spread.”

The worms also could have jeopardized the health of their hosts, especially during years of famine when both parasite and human competed for scarce nutrients from meals few and far between. Previous studies found that between 15 to 20 percent of nobles and the clergy died from malnutrition and infectious disease during the crusades.

Although death records for poor soldiers are not available, the authors think it’s safe to assume that malnutrition probably hit the lower-ranking crusaders even harder.

“It is quite likely that a heavy load of intestinal parasites in soldiers on crusade expeditions and in castles undergoing long sieges would have predisposed to death from malnutrition,” they write. “This clearly has implications for our understanding of health and disease on mediaeval military expeditions such as the crusades.”

Before contemporary readers breathe a sign of relief that these parasites infested the guts of people living more than 800 years ago, it’s important to note that the giant roundworm infests an estimated one-sixth of all humans living today. As the authors write, “In modern times *A. lumbricoides* and *T. trichiura* are two of the most common and widespread intestinal parasites.” Other parasites continue to plague human populations worldwide, especially in developing countries. Who knows what the archaeologists of the future will find in the scum of your latrine?

Please visit the site: <http://blogs.smithsonianmag.com/science/2013/06/this-castles-toilet-still-holds-parasites-from-crusaders-feces/>

**EXCAVATION UNCOVERS ANCIENT  
EGYPTIAN TOWN IN NORTHERN EGYPT  
REMAINS OF AN ANCIENT EGYPTIAN  
TOWN, INHABITED FROM AROUND 2000BC  
UNTIL THE GRAECO-ROMAN ERA, HAVE  
BEEN DISCOVERED IN QALIOUBIYA  
GOVERNORATE, BY NEVINE EL-AREF**

At the Hyksos fort at Tel El-Yahoud area in Qalioubiya governorate in northern Egypt, an Egyptian excavation mission by the Ministry of State for Antiquities has stumbled upon an ancient Egyptian town from the Middle Kingdom, which dates from approximately 2000 BC to 1700 BC.

The town includes a residential area with a collection of houses and royal palaces, as well as a four metre-tall mud brick fortress and a necropolis with a large number of rock-hewn tombs.

A collection of lamps, amulets, clay pots, scarabs and faience floor tiles that were once used to decorate the palace of the New Kingdom kings Meneptah and Ramses II were also unearthed. A collection of mud brick tombs from the Hyksos era was also found, as were remains of a temple dedicated to the god Sotekh who was worshipped during the Hyksos era was also unearthed.

Adel Hussein, head of the ancient Egyptian department at the antiquities ministry, said that excavation mission in Tel El-Yahoud area was resumed after having being stopped after the January 2011 revolution.

He pointed out that such a site is very important as it reveals the daily life of ancient Egyptians from the New Kingdom until the Graeco–Roman era.

The town was also important from a military point of view, Hussein said, saying that excavations had shown that the town was surrounded by a wall to protect it.

**Please visit the site:**

**<http://english.ahram.org.eg/NewsContent/9/40/74350/Heritage/Ancient-Egypt/Excavation-uncovers-ancient-Egyptian-town-in-north.aspx>**

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## **3,500-YEAR-OLD CONSTRUCTION FOUND IN NORTHWESTERN CITY**

The excavations that have been carried out by a Japanese group in the town of Karakeçili in the northwestern province of Kırıkkale since 2009 are continuing. A 3,500-year-old construction from the Hittite period has been unearthed during the excavations. Kimiyashi Matsumura, an academic of Archeology at Kırşehir University, is heading the excavations and the findings have been delivered to the Ministry of Arts and Culture.

When works are completed, the protected area of Büklükale will be open to tourists as the stone houses from the Hittite civilization have touristic value.

### **Çeşnigir Bridge**

During a recent visit to the area, Kırıkkale Governor Ali Kolat and a committee also visited the Çeşnigir Bridge, constructed by the Köprüköyü Municipality. Kolat said that they would protect the 3500-year-old construction, adding, "Karakeçili is home to a long history. Çeşnigir Bridge belongs to the Seljuk era. We are going to make our city known in terms of tourism by enlightening others about these historical artifacts."

Matsumura said that the area was one of the biggest cities of the Hittite civilization. "Kızılırmak was a way for merchandising. I believe we are going to have worthy acquisitions as a consequence of these excavations," he added.

**Please visit the site: <http://www.hurriyetdailynews.com/3500-year-old-construction-found-in-northwestern-city.aspx?pageID=238&nID=49032&NewsCatID=375>**

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## **FOR ITS LATEST BEER, A CRAFT BREWER CHOOSES AN UNLIKELY PAIRING: ARCHAEOLOGY**

CLEVELAND — The beer was full of bacteria, warm and slightly sour.

By contemporary standards, it would have been a spoiled batch here at Great Lakes Brewing Company, a craft beer maker based in Ohio, where machinery churns out bottle after bottle of dark porters and pale ales.

But lately, Great Lakes has been trying to imitate a bygone era. Enlisting the help of archaeologists at the University of Chicago, the company has been trying for more than year to replicate a 5,000-year-old Sumerian beer using only clay vessels and a wooden spoon.

“How can you be in this business and not want to know from where your forefathers came with their formulas and their technology?” said Pat Conway, a co-owner of the company.

As interest in artisan beer has expanded across the country, so have collaborations between scholars of ancient drink and independent brewers willing to help them resurrect lost recipes for some of the oldest ales ever made.

“It involves a huge amount of detective work and inference and pulling in information from other sources to try and figure it out,” said Gil Stein, the director of the Oriental Institute of the University of Chicago, which is ensuring the historical accuracy of the project. “We recognize that to get at really understanding these different aspects of the past, you have to work with people who know things that we don’t.”

There is an unresolved argument in academic circles about whether the invention of beer was the primary reason that people in Mesopotamia, considered the birthplace of Western civilization about 10,000 years ago, first became agriculturalists.

By about 3200 B.C., around the time the Sumerians invented the written word, beer had already held a significant role in the region’s customs and myths. Sipped through a straw by all classes of society, it is also believed to have been a source of drinkable water and essential nutrients, brewed in both palaces and in average homes. During the rule of King Hammurabi, tavern owners were threatened with drowning if they dared to overcharge.

But for all the notes that Sumerians took about the ingredients and the distribution of their libations, no precise recipes have ever been found. Left behind were only cuneiform texts that vaguely hint at the brewing process, perhaps none more poetically than the Hymn to Ninkasi, the Sumerian goddess of beer.

The song, dated around 1800 B.C., had entranced modern brewers before.

A brew based on the hymn was made as part of a partnership in the early 1990s between Anchor Brewing Company in San Francisco and the University of Chicago, where a well-known interpretation of the text was translated in 1964.

Reproductions of ancient alcohols have since grown in popularity, largely through a partnership between the Dogfish Head Craft Brewery in Delaware and Patrick E. McGovern, an archaeological chemist at the University of Pennsylvania Museum. Together, they have recreated beers from prehistoric China, from ancient Egypt and from evidence found in what is believed to be the tomb of King Midas.

“Of different people who do fermented beverages, microbrewers are the most willing to experiment,” Dr. McGovern said. “They’re ready to try anything.”

Great Lakes has no plan to sell its brew, also based on the Hymn to Ninkasi, to the public. The project, unlike others that recreate old recipes on modern equipment, is an educational exercise more than anything else. It has been shaped by a volley of e-mails with Sumerian experts in Chicago as both sides try to better understand an “off the grid” approach that has proved more difficult than first thought.

In place of stainless steel tanks, the Oriental Institute gave the brewery ceramic vessels modeled after artifacts excavated in Iraq during the 1930s. In keeping with the archaeological evidence, the team successfully malted its own barley on the roof of the brew house.

It also asked a Cleveland baker to help make a bricklike “beer bread” for use as a source of active yeast — by far the most difficult step in the process.

The archaeologists, who have committed their careers to studying Sumerian culture, said having professional brewers involved in the effort had helped them ask questions they had not considered.

“We keep going back to the evidence and finding new hints that can help us choose between different interpretations,” said Tate Paulette, a doctoral student and a lead researcher on the project. “We are immersed in studying Mesopotamia, and this is a fundamental thing that we don’t understand well enough.”

While the project continues, Great Lakes’ brewing vessels are already a popular addition to guided tours of the brewery. The company is making plans to showcase its Sumerian beer at events in Cleveland and Chicago by the end of this summer, offering a public tasting of the final brew alongside an identical recipe made with more current brewing techniques.

In the meantime, there is still some tweaking to do.

After months of experiments in the brewery’s laboratory, Nate Gibbon, a brewer at Great Lakes, said he had stood over a ceramic vat on a recent Wednesday, cooking outside on a patch of grass. The fire that heated the vat was fueled by manure.

The batch, spiced with cardamom and coriander, fermented for two days, but it was ultimately too sour for the modern tongue, Mr. Gibbon said.

Next time, he will sweeten it with honey or dates.

Without sophisticated cleaning systems to rid the vessels of natural bacteria, Mesopotamian imbibers might have been more familiar with the brew's unwanted vinegar flavor, archaeologists said. Yet even with the most educated guesswork, they said, the Sumerian palate might never be fully uncovered. "We're working with questions that are not going to have a final answer," Mr. Paulette said. "It's just back and forth, trying to move toward a better understanding. We're pretty comfortable with that."

Please visit the site: <http://www.nytimes.com/2013/06/18/us/for-its-latest-beer-a-craft-brewer-chooses-an-unlikely-pairing-archaeology.html>

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## **ARCHIMEDES: SEPARATING MYTH FROM SCIENCE, BY KENNETH CHANG**

For the last time: Archimedes did not invent a death ray.

But more than 2,200 years after his death, his inventions are still driving technological innovations — so much so that experts from around the world gathered recently for a conference at New York University on his continuing influence.

The death ray legend has Archimedes using mirrors to concentrate sunlight to incinerate Roman ships attacking his home of Syracuse, the ancient city-state in the southeast Sicily. It has been debunked no fewer than three times on the television show “Mythbusters” (the third time at the behest of President Obama).

Rather, it is a mundane contraption attributed to the great Greek mathematician, inventor, engineer and military planner — the Archimedes screw, a corkscrew inside a cylinder — that has a new use in the 21st century. For thousands of years, farmers have used this simple machine for irrigation: Placed at an angle with one end submerged in a river or a lake, the screw is turned by a handle, lifting water upward and out at the other end.

A couple of decades ago, engineers found that running an Archimedes screw backward — that is, dropping water in at the top, causing the screw to turn as the water falls to the bottom — is a robust, economical and efficient way to generate electricity from small streams. The power output is modest, enough for a village, but with a small impact on the environment. Unlike the turbine blades that spin in huge hydropower plants like the Hoover Dam, an Archimedes screw permits fish to swim through it and emerge at the other end almost unscathed.

Such generators have been built in Europe, including one commissioned by Queen Elizabeth II of England to power Windsor Castle; the first in the United States could start operating next year.

And Archimedes’ ideas are showing up in other fields as well.

“He just planted the seeds for so many seminal ideas that could grow over the ages,” said Chris Rorres, an emeritus professor of mathematics at Drexel University, who organized the conference at N.Y.U.

A panoply of devices and ideas are named after Archimedes. Besides the Archimedes screw, there is the Archimedes principle, the law of buoyancy that states the upward force on a submerged object equals the weight of the liquid displaced. There is the Archimedes claw, a weapon that most likely did exist, grabbing onto Roman ships and tipping them over. And there is the Archimedes sphere, a forerunner of the planetarium — a hand-held globe that showed the constellations as well as the locations of the sun and the planets in the sky.

“Here was someone who just changed how we look at the universe,” Dr. Rorres said.

Only a handful of Archimedes' writings survive, and much of what we think we know about him was written centuries after his death.

Some of the legends, like using mirrors to set the Roman ships afire, proved too good to be true. The same may go for the tale of Archimedes figuring out, while sitting in a bathtub, how to tell if the maker of a crown for the king had fraudulently mixed in some silver with the gold; according to this story Archimedes, too excited to put on clothes, ran naked through the streets of Syracuse shouting, "Eureka!"

As with the mirrors, the underlying principle works. But in practice, the tiny difference in volume between a crown made of pure gold and one made of a mixture of gold and silver is too small to be reliably measured.

Some of the talks at the conference were about using present-day ingenuity to figure out what Archimedes actually achieved in antiquity.

Michael Wright, a researcher at Imperial College London, has been trying to decipher how the Archimedes sphere showed the night sky.

Although it is described in historical writings, no pieces or even drawings of it have survived. Others had already made celestial spheres, globes that show the positions of the constellations.

The Roman historian Cicero described the Archimedes sphere as uninteresting at first glance until it was explained. "There was a wonderful contrivance due to Archimedes inside," he wrote. "He had devised a way in which a single rotation would generate the several non-uniform motions."

If this description is taken literally, it would seem that Archimedes figured out the gearing needed to mimic the motion of the planets, including the retrograde motion where they appear to stop and reverse direction for a while before proceeding in their usual direction.

"This instrument was just like any other celestial sphere, except with the addition of indicators for the Sun, Moon, the planets moving over the sphere and a mechanism inside the sphere to move them," Mr. Wright said.

In the spring, he began building his version of the Archimedes sphere. He presented it in public for the first time at the conference.

"I can't guarantee that the original was like this," Mr. Wright said.

"What I can say is this, in the simplest way that I can imagine it, fits the evidence we have. We've been talking for 2,000 years about this thing that Archimedes made, and nobody seems to have offered to show people what it was like. I had an idea. I thought it was worth making, even if it was so people could have an argument about it and disagree with it. That's a good way to get things going."

Dr. Rorres said the singular genius of Archimedes was that he not only was able to solve abstract mathematics problems, but also used mathematics to solve physics problems, and he then engineered devices to take advantage of the physics. "He came up with

fundamental laws of nature, proved them mathematically and then was able to apply them,” Dr. Rorres said.

Archimedes oversaw the defenses of Syracuse, and while death ray mirrors and steam cannons (another supposed Archimedes invention debunked by “Mythbusters”) were too fanciful, the Archimedes claw appears to have been a real weapon used against the Roman navy.

It is very likely that it took advantage of two scientific principles Archimedes discovered.

With his law of buoyancy, he was able to determine whether a paraboloid (a shape similar to the nose cone of a jetliner) would float upright or tip over, a principle of utmost importance to ship designers, and Archimedes probably realized that the Roman ships were vulnerable as they came close to the city walls.

“Archimedes knew about the stability of these kinds of ships,” said Harry G. Harris, an emeritus professor of structural engineering at Drexel who has built a model of the claw. “When it is moving fast through the water, it is stable. Standing still or going very slow, it is very easy to tip over.”

So using an Archimedean principle — the law of the lever, which enables a small force to lift a large weight, as in seesaws and pulleys — a claw at the end of a chain would be lowered and hooked into a Roman ship, then lifted to capsize the ship and crash it against the rocks.

Syracuse won the battle but was weakened under a long siege and fell three years later. And in 212 B.C., at the age of about 75, Archimedes was killed by a Roman soldier, supposedly furious that he refused to stop work on a mathematical drawing. His last words: “Do not disturb my circles!”

Of course, that bit about the circles is probably also a myth.

**Please visit the site: <http://www.nytimes.com/2013/06/25/science/archimedes-separating-myth-from-science.html> [Go there for pix and videos]**

## **NEW MOSAICS DISCOVERED IN SYNAGOGUE EXCAVATIONS IN GALILEE**

Excavations in the Late Roman (fifth century) synagogue at Huqoq, an ancient Jewish village in Israel's Lower Galilee, have brought to light stunning mosaics that decorated the floor.

The Huqoq excavations are directed by Jodi Magness of the University of North Carolina at Chapel Hill and co-directed by Shua Kisilevitz of the Israel Antiquities Authority. Sponsors are UNC, Brigham Young University, Trinity University in Texas, the University of Oklahoma, the University of Toronto and the University of Wyoming. Students and staff from UNC and the consortium schools are participating in the dig.

Last summer, a mosaic showing Samson and the foxes (as related in the Bible's Judges 15:4) was discovered in the synagogue's east aisle.

This summer, another mosaic was found that shows Samson carrying the gate of Gaza on his shoulders (Judges 16:3). Adjacent to Samson are riders with horses, apparently representing Philistines. Although he is not described as such in the Hebrew Bible, Samson is depicted as a giant in both scenes, reflecting later Jewish traditions that developed about the biblical judge and hero.

Biblical scenes are not uncommon in Late Roman synagogue mosaics, but only one other ancient synagogue in Israel (at Khirbet Wadi Hamam) is decorated with a scene showing Samson.

“The discovery of two Samson scenes in the Huqoq synagogue suggests that it was decorated with a Samson cycle — the first such cycle known in Israel,” said Magness, Kenan Distinguished Professor in the religious studies department in UNC's College of Arts and Sciences. “A cycle is a series of scenes about Samson, in which different episodes relating to Samson are depicted.”

Another portion of mosaic discovered in the synagogue's east aisle preserves a scene that includes several male figures and an elephant.

Below that is an arcade, with the arches framing young men arranged around a seated elderly man holding a scroll. The strip below shows a bull pierced by spears, with blood gushing from his wounds, and a dying or dead soldier holding a shield.

This mosaic differs in style, quality and content from the Samson scenes, Magness said.

“It might depict a triumphal parade or perhaps a martyrdom story based on Maccabees 1-4, in which case it would be the first example of an apocryphal story decorating an ancient synagogue,” she said.

“Apocryphal books were not included in the Hebrew Bible/Jewish canon of sacred scripture.”

The mosaics have been removed from the site for conservation, and the excavated areas have been backfilled. Excavations are scheduled to continue in summer 2014.

Note: Magness can be reached at [magness@email.unc.edu](mailto:magness@email.unc.edu) or by phone in Israel until July 5.

Please visit the site: <http://uncnews.unc.edu/content/view/6087/73/>

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## **LONG-ABUSED ANCIENT BABYLON** **RESTORED TO ITS GLORY, BY WILLIAM** **DUNLOP - BABYLON**

Ishtar Gate; a marvel

At ancient Babylon's Ishtar Gate, Iraqi workers labour with a heavy saw, hammers, a chisel and crowbar to break up and remove a concrete slab that is hastening the structure's decay.

The concrete lies between the two long, towering walls of tan bricks decorated with processions of bulls and dragons that make up the more than 2,500-year-old Ishtar Gate, in what is now Iraq's Babil province.

The masonry slab was laid during the late dictator Saddam Hussein's rule.

Removing the concrete is deemed essential to preserving the Ishtar Gate at Babylon, which also served as the base for a later gate of the same name, the reassembled remains of which are now located in Germany.

In the 1980s, "there was a large intervention of modern masonry inserted behind the facades" of the Ishtar Gate, in addition to "changes in the terrain behind, and resurfacing of the base of the gate with concrete," said Jeff Allen, field manager for the Future of Babylon project which is carrying out the work.

All of those factors are accelerating "the rate of damage at the site, and decay, and what we're doing at Ishtar Gate is trying to arrest or to slow down those mechanisms that are causing the gate to collapse," Allen said.

Removing the concrete "will allow the ground to breathe and evaporate water, because at the present time... the water cannot escape, so it routes through the easiest direction to get to the surface," which is through the gate itself, he said.

The Future of Babylon project is a joint effort between the World Monuments Fund, which works to save key cultural heritage sites, and Iraq's State Board of Antiquities and Heritage.

The project's original aim was to complete a management plan for Babylon, but it has been expanded to include restoration and conservation work at various parts of the site as well.

Babylon, one of the most famed cities of antiquity and now an important archaeological site, has a long history of damage and abuse.

In addition to the concrete problem, modern work atop the Ishtar Gate directs rainwater down its front, causing erosion.

And parts of the gate are riddled with modern bricks that will have to be removed and replaced with others that are historically accurate.

In the past, people also removed original bricks from Babylon for use in construction elsewhere.

A shoddily-built modern brick wall meant to imitate an ancient structure runs along the remains of the Processional Way, a path walked by giants of history including Alexander the Great.

"It's terrible work, but it lies on top of original brickwork," Allen said.

Other ancient structures at the site have been built upon in similar fashion.

'A disaster for conservation work'

The construction at Babylon was begun in the 1970s but accelerated under Saddam's rule, Allen said.

"Saddam Hussein gave an order to make Babylon 'presentable' to the public for a festival he wanted to hold," Allen said.

"It's disastrous for the integrity (of the site), it's a disaster for conservation work."

Saddam also had multiple man-made hills and lakes built at Babylon.

A tan palace, which bears Saddam's initials and image and is now defaced inside with masses of graffiti, is visible through the haze of a dust storm on one of the hills overlooking Babylon.

The dictator likened himself to Nebuchadnezzar II, who expanded Babylon's power and restored the city.

But he ended up more like Darius III, who oversaw a series of military disasters, fled and was likely killed by his countrymen.

Saddam himself was convicted of crimes against humanity by an Iraqi special court and executed in 2006.

But the abuse of the site of ancient Babylon is not limited to Saddam's rule.

The British once ran a railway line through the site, Allen said, while various roads were later put in, as were three different oil pipelines.

There are also asphalt car parks within the boundaries of the site, and American and Polish forces used it for a military base after the 2003 US-led invasion that toppled Saddam, causing further damage.

"This site has been abused for decades, decades and decades -- it has to stop!" Allen said.

"And right now, the problem isn't Saddam or the military occupation that was here. The problem is people building houses all over the site, and nobody is doing a thing, because the government cannot cooperate within itself to enforce regulations that exist," he said.

A number of houses, most of them constructed of unpainted cement blocks or bricks, can be seen inside the boundaries of the site of ancient Babylon.

And Sinjar, a village with thousands of inhabitants, lies within the boundaries of the site across a branch of the Euphrates River from Ishtar Gate.

The fact that there are modern houses built at Babylon is itself problematic, and their septic systems also pose a danger, dispersing sewage into the soil and potentially damaging unexcavated remains of the ancient city.

Iraq has unsuccessfully sought to have Babylon admitted to the UNESCO World Heritage List, but plans to try again.

"Our work now is to restore Babylon and complete the file of Babylon to include it in the World Heritage List," said Hussein al-Amari, the top Iraqi antiquities official in Babil province, but this requires large sums of money.

Iraqi government funding for work at Babylon has been noticeably lacking.

"There's a failure in financing archaeology," Allen said.

Amari added that he hopes Babylon will become a major source of income for Iraq and a "place to receive all tourists."

But with the myriad difficulties to be overcome at the site, plus persistent security concerns in Iraq, such goals remain years away.

**Please visit the site: <http://www.middle-east-online.com/english/?id=59636>**

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## **POLISH SCIENTISTS WILL EXAMINE HOW CLIMATE CHANGED IN EGYPT THOUSANDS OF YEARS AGO**

Polish scientists want to examine how climate changed in the Nile delta over the millennia. Head of the pioneering program that will also involve researchers from Egypt and China, is Prof. Leszek Marks of the Faculty of Geology, University of Warsaw.

Group of researchers have just returned from reconnaissance expedition to the Egyptian Nile delta. During the three-year Nile Climate Change Project (NCCP) they will prepare the reconstruction of climate changes in the region over the millennia.

"We will drill a series of 40 meters deep wells near the lakes Mariut, El Brolus and El Manzija in the northern part of the Nile delta and Lake Karun (Birkat Qaroun) in the Fayum Oasis. We will obtain lake sediment core samples and subject them to lithological, palaeo-climatic, palaeo-ecological and chronostratigraphic analysis" - told PAP project coordinator, Dr. Fabian Welc from the Institute of Archaeology of the Cardinal Stefan Wyszyński University in Warsaw.

Scientists are interested in the changes that have occurred during the Holocene. This geological epoch began shortly after the end of the last ice age, about 11.5 thousand years ago. The project will reconstruct a scenario of climate change at the local (Egypt) and regional (north-east Africa) scale. Researchers will reconcile the results with each phase of the development of civilization of ancient Egypt, especially in the context of sudden and catastrophic climate fluctuations.

"We are particularly interested in drastic climate changes in the third millennium BC, which contributed to the sudden collapse of the Old Kingdom in Egypt, disintegration of the Akkadian state in Mesopotamia and the abrupt end of the city civilization Harappa in India, referred to as the climatic event Bond 3" - said Dr. Welc.

The international team of scientists includes: Prof. Leszek Marks (Department of Climate Geology, Faculty of Geology, University of Warsaw), Prof. Alaa Salem (Egyptian project coordinator, Department of Earth Sciences, University of Kafr El Sheikh in the Nile Delta), Dr. Fabian Welc and Prof. Jerzy Nitychoruk, lacustrine sediments expert (Department of Climate Geology, Faculty of Geology, University of Warsaw). The project will also be supported by many other scholars from Poland, Egypt and China.

The three-year project is funded by a grant awarded by the National Science Centre to the Faculty of Geology, University of Warsaw. The project has the logistical support of the Centre of Mediterranean Archaeology, University of Warsaw, through its research station in Cairo.

Please visit the site: <http://www.naukawpolsce.pap.pl/en/news/news,395823,polish-scientists-will-examine-how-climate-changed-in-egypt-thousands-of-years-ago.html>