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<http://archaeometry.org.gr>

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# Πληροφοριακό Δελτίο της Ελληνικής Αρχαιομετρικής Εταιρείας

**- Ιούνιος 2019 -**

*Η κακία είναι μια ανοησία για εκείνους που δεν έχουν  
καταλάβει ότι δεν ζούμε για πάντα. (Αριστοτέλης)*

## Newsletter of the Hellenic Society of Archaeometry

**- June 2019 -**

**Nr. 219**

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## **ΣΥΝΕΔΡΙΑ - CONFERENCES/WORKSHOPS**

# **THE ARCHAEOLOGY OF CYPRUS AND THE WIDER MEDITERRANEAN: A CONFERENCE IN HONOUR OF A. BERNARD KNAPP, 6-8 JUNE, 2019, ARCHAEOLOGICAL RESEARCH UNIT OF THE UNIVERSITY OF CYPRUS, NICOSIA, CYPRUS**

Over more than 40 years from the late 1970s to the present day, A. Bernard Knapp has become a key and defining voice in the scholarship on prehistoric Cyprus and the wider Mediterranean. He is the author, co-author, or editor of 24 books and numerous articles, book chapters and reviews, and is the co-editor of the leading *Journal of Mediterranean Archaeology*, which he founded in 1988. Notable as a scholar combining ancient Near Eastern textual expertise with a focus on the Bronze Age archaeology of Cyprus and the eastern Mediterranean, starting with his Berkeley PhD dissertation of 1979, ‘A Re-examination of the Interpretation of Cypriote Material Culture in the MCII-LCI Period in the Light of Textual Data’, Knapp has ranged from an early focus especially on the Bronze Age and issues around Cypriot archaeometallurgy and trade, to take on the entire prehistory of Cyprus from earliest times (*The Archaeology of Cyprus from Earliest Prehistory through the Bronze Age*, 2013), as well as the wider history and archaeology of the prehistoric Mediterranean world, and a range of topics in archaeological theory. Most recently, Knapp has engaged with the maritime archaeology of the east Mediterranean in his 2018 volume: *Seafaring and Seafarers in the Bronze Age Eastern Mediterranean*. In between, he has also co-directed two leading archaeological survey projects on Cyprus, the Sydney Cyprus Survey Project (published 2003) and the Troodos Archaeological and Environmental Survey Project (published 2013).

We meet as appropriate in Nicosia, Cyprus, to celebrate Bernard Knapp’s extraordinary and productive career which has come to define many aspects of the prehistory of Cyprus and the Mediterranean. The workshop—entitled **The Archaeology of Cyprus and the Wider Mediterranean: A Conference in Honour of A. Bernard Knapp**—is organized by Sturt Manning (Cornell University) in collaboration with Vasiliki Kassianidou (Archaeological Research Unit, University of Cyprus) and Lindy Crewe (Cyprus American Archaeological Research Institute). It will take place at the *Archaeological Research Unit of the University of Cyprus, 12 Gladstone Street, 1095 Nicosia, CYPRUS* and is open to those who wish to attend.

### ***Program***

#### ***Day 1. Afternoon Thursday 6 June***

16:25-16:45

#### ***Welcome and Opening Remarks:***

Sturt Manning

Vasiliki Kassianidou

Lindy Crewe

Marina Solomidou-Ieronymidou

- 16:45-17:15 **Jennifer Webb:** Cyprus' external connections in the prehistoric Bronze Age: refining a maximalist position
- 17:15-17:45 **Sophocles Hadjisavvas:** Mathiatis *Mavrovouni*. A Miner's Sanctuary
- 17:45-18:15 *BREAK*
- 18:15-18:45 **Vasiliki Kassianidou:** An evaluation of Bernard Knapp's model for the organization of copper production in the Late Cypriot, based on the results of current research
- 18:45-19:15 **Lindy Crewe:** Mortuary practices at the Chalcolithic cemetery of Souskiou Laona
- 19:15-19:45 **David Rupp & Metaxia Tsipopoulou:** Remembering a complex memory landscape: The Late Minoan III interventions in the Pre- and Proto Palatial Cemetery at Petras - Kephala (Siteia, Crete).

*Day 2. Friday 7<sup>th</sup> June*

- 09:00-09:30 **Catherine Kearns:** The limits of protohistory: towards an archaeology of Cypriot Iron Age communities
- 09:30-10:00 **Georgia Andreou:** Reconsidering the mountainous landscapes of Cyprus in antiquity
- 10:00-10:30 **Michael Given:** From settlement hierarchies to entangled communities: towards a theory of survey
- 10:30-11:00 *COFFEE BREAK*
- 11:30-12:00 **Kevin Fisher:** Toward a Social Life of Things in Late Bronze Age Cyprus
- 12:00-12:30 **Ann Brysbaert:** SETinSTONE? The chaine operateire of 'building big' in the LBA Argive Plain, Greece
- 12:30-13:00 **Chris Monroe:** All the King's Wine? Late Bronze Age Vineyards in Texts from Emar and Ugarit
- 13:00 *LUNCH*
- 14:30-15:00 **Carrie Fulton:** Re-assessing the Anchorage of Maroni-Tsarroukkas within Bronze Age Maritime Trade

- 15:00-15:30            **Michal Artzy:** Mariners' Cuisine? Cook Ware at the LBII Tell Abu Hawam Anchorage
- 15:30-16:00            *COFFEE BREAK*
- 16:00-16:30            **Stella Demesticha,** 'Billow and breeze, islands and seas': the Maritime Landscape of Late Roman Cyprus
- 16:30-17:00            **Sturt Manning,** An Archaeology of Climate (and Cyprus): a prolegomenon
- 17:00-17:30            **John Cherry,** Thirty Years Before the Mast: At the Helm of *JMA* with Bernard Knapp
- 17:30-18:00            **Bernard Knapp:** Reflections and Comments
- 18:00                    *RECEPTION*

NOTE: **8<sup>th</sup> June** CAARI-Department of Antiquities-Archaeological Research Unit (University of Cyprus) Workshop.

CAARI reception evening 8<sup>th</sup> June.

\*\*\*\*\*

**Professor Vasiliki (Lina) Kassianidou**  
**Director of the Archaeological Research Unit**  
Archaeological Research Unit, Department of History and Archaeology  
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NARNIA web page: <http://narnia-itn.eu/>

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**IAMS SUMMER SCHOOL IN**  
**ARCHAEOMETALLURGY, 24TH JUNE - 5TH**  
**JULY 2019, UCL INSTITUTE OF**  
**ARCHAEOLOGY**

Dear colleagues,

We are pleased to announce that the IAMS Summer School in Archaeometallurgy <https://www.ucl.ac.uk/iams/iams-news-publication/2019-iams-summer-school> will take place at the UCL Institute of Archaeology from 24th June until 5th July 2019.

Running for more than two decades, this summer school is offered to anyone interested in the archaeology of metallurgy. It has been gathering professionals, academics, students, and enthusiasts while covering a diverse range of topics, including mining, metal production, experimental reconstruction, field methods, and the analysis of metallic artefacts.

Lectures will cover both ferrous and non-ferrous metals, involve artefact handling sessions, and demonstrate a variety of investigative techniques (metallography, SEM-EDS, and pXRF).

Registration fee for both weeks is £400, one week £250. Some additional subsidies may be available for students in financial hardship.

Please contact Mike Charlton ([m.charlton@ucl.ac.uk](mailto:m.charlton@ucl.ac.uk)<<mailto:m.charlton@ucl.ac.uk>>) and Miljana Radivojević ([m.radivojevic@ucl.ac.uk](mailto:m.radivojevic@ucl.ac.uk)<<mailto:m.radivojevic@ucl.ac.uk>>) for more information.

We would very much appreciate if you can circulate this to other interested parties.

With best wishes

Miljana and Mike

\*\*\*\*\*

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## **3<sup>RD</sup> WORKSHOP "YOUNG RESEARCHERS IN ARCHAEOLOGY" (YRA), 22ND - 24TH OF SEPTEMBER 2-19, MAE OF NANTERRE UNIVERSITY, PARIS**

Dear colleagues,

After two years in Germany, the third Workshop "Young Researchers in Archaeology" (YRA) will be held from **22nd to 24th of September in Paris, at the MAE of Nanterre University**. We cordially invite all master students, PhD students and young post-docs to present their theses or projects in talks (15 min) or poster formats. The disciplinary fields concerned are: archeology, art history, anthropology, chemistry, biology, conservation, cultural heritage, earth sciences, material sciences with a link to archaeometric studies. The main workshop aim is to offer early career researchers an interdisciplinary platform to exchange in a relaxed atmosphere on various subjects. Labs tour are also planned at the CEA Saclay (LAPA and LMC14) to meet research teams working in archaeometric fields.

If you are interested in participating, please submit an **english** abstract with a maximum of **250 words** until the **31 st of july**, by filling in the form available on this link:

[https://docs.google.com/forms/d/e/1FAIpQLSeo-QKfNY8V0n6mHXWDQbsrS4EvyQZG34P6X1D4N19xo-s0XA/viewform?usp=sf\\_link](https://docs.google.com/forms/d/e/1FAIpQLSeo-QKfNY8V0n6mHXWDQbsrS4EvyQZG34P6X1D4N19xo-s0XA/viewform?usp=sf_link)

Note that registration is open until the day of the workshop and the fee is 30 €

For any other question please contact us,  
Manon Gosselin ([manon.gosselin@cea.fr](mailto:manon.gosselin@cea.fr))  
Mélissa Cadet ([melissa.cadet@cea.fr](mailto:melissa.cadet@cea.fr))  
Thomas Rose ([roset@post.bgu.ac.il](mailto:roset@post.bgu.ac.il))

ArScAn (UMR 7041), LAPA-IRAMAT-NIMBE-CEA/CNRS (UMR 3685)  
PreTech (UMR 7055),LAPA-IRAMAT-NIMBE-CEA/CNRS (UMR 3685)  
Ben-Gurion University of the Negrev, Beer-Sheva, Israël.

**43<sup>RD</sup> INTERNATIONAL SYMPOSIUM ON  
ARCHAEOLOGY, MAY 18<sup>TH</sup> TO 22<sup>TH</sup> 2020,  
LISBON, PORTUGAL**

Dear colleagues,

The 43<sup>rd</sup> International Symposium on Archaeology will be held from May 18<sup>th</sup> to 22<sup>th</sup> 2020 in Lisbon, Portugal.

ISA 2020 is a specialized forum for research and applications of Archaeology and Archaeological Sciences that covers the full spectrum of topics, materials, techniques, chronologies and regions.

You may find the complete information regarding the scope of the symposium, the venue, important dates, registration, etc, in the web page <https://www.isa2020-lisboa.pt/>  
Please spread the Symposium within your colleagues.

Kind regards

Isabel Dias

Local Organizing Committee

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**ISA2020 CONTACT :** [isa2020@isa2020-lisboa.pt](mailto:isa2020@isa2020-lisboa.pt)

Tel: (+351) 21 994 6183

Facebook: <https://www.facebook.com/isa2020lisboa/>

Instagram: <https://www.instagram.com/isa2020lisboa/>

Twitter: <https://twitter.com/isa20206>

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**ISA 2020**  
**43<sup>rd</sup> International Symposium  
on Archaeometry**  
18-22 May 2020  
Lisbon, Portugal

**DATES TO RETAIN**  
EARLY REGISTRATION - before February 15  
15 November 2019 - deadline for abstract submission  
19 January 2020 - deadline for abstract acceptance

<https://www.isa2020.lisboa.pt>  
<https://twitter.com/isa2020lisboa>  
<https://www.facebook.com/isa2020lisboa>  
<https://www.instagram.com/isa2020lisboa>  
[isa2020@isa2020.lisboa.pt](mailto:isa2020@isa2020.lisboa.pt)



### SESSIONS

Remote Sensing, Geophysical Prospection and Field archaeology  
Archaeochronometry (organic and inorganic materials)  
Biological Materials and Bioarchaeology  
Technology/provenance - stone/pigments/plaster  
Technology/provenance - ceramics/vitreous/glass  
Technology/provenance - metals  
Human-Environment Interactions  
**SPECIAL SESSION:**  
Nuclear and Radioactive-based Techniques in Cultural Heritage



### ORGANIZATION

#### Local Organizing Committee

Chair: M. Isabel Dias  
Members: M. Isabel Prudêncio, J. Carlos Warrenborgh

#### International Standing Committee of ISA

President: M.S. Tite (Oxford)  
Chairman: Y. Maniatis (Athens)  
Members: L. Barba (Mexico City), K.T. Biro (Budapest), P. Degryse (Leuven), J. Pérez-Arantes (Zaragoza), J.L. Ruvalecaba Sil (Mexico City), R.H. Tylot (Tampa), M. Walton (Chicago), N. Zacharias (Kalamata), M. Isabel Dias (Lisbon)

## **MA-XRF 2019 - MA-XRF SCANNING IN CONSERVATION, ART AND ARCHAEOLOGY, CATANIA, 15-16 OCTOBER 2019, CALL FOR ABSTRACTS**

The MA-XRF 2019 **Call for Abstracts** is now open. The workshop aims to bring together scholars having or seeking to gain experience with MA-XRF scanning and related methods of analysis of works of art. At the meeting, the current applications of MA-XRF will be summarized. The focal point of the discussions will be to consider the advantages and limitations of using MA-XRF in conjunction with other hyperspectral methods of analysis and/or in combination with micro-analytical investigations of small samples.

The meeting will be based on **ORAL** contributions that are included in the scientific program after a review process performed by the Scientific Committee of the workshop. Poster session will be programmed at the meeting only if strictly necessary.

### **Important Dates:**

Deadline for the Abstract submission: July 31, 2019  
Notification of Abstract Acceptance: August 20, 2019  
Registration deadline: September 1, 2019  
Final program: September 15, 2019

Please note that the abstract submission is NOT the **registration form**. The presenting author of an accepted abstract must register and complete the full payment prior to the deadline of September 1, 2019. Please note that registration is required in order to be included in the scientific program, to have the abstract in the “Book of Abstracts” of the workshop, and to be invited to submit a full paper for the publication in a **special issue of X-ray Spectrometry**. Registration to the workshop can be performed at the link: [MA-XRF 2019 workshop](#). The registration will be managed by the Shougun Travel agency.

### **Abstract submission:**

To submit your abstract for an **ORAL** contribution to the MA-XRF 2019 workshop, please follow the instructions below.

All abstracts must be submitted in English. All abstracts will be forwarded to the Scientific Committee for review. The accepted abstract from registered presenting authors will be published in the “Book of Abstracts” of the workshop and will be invited to submit a paper for the publication in a special issue of X-ray Spectrometry.

Abstract submission is managed through the Easy-Chair conference system. To submit your abstract use to the web address at the URL:  
<https://easychair.org/my/conference?conf=maxrf2019>

If you do not have already an account, choose “sign up for an account” and follow the procedure to obtain an account, using the e-mail you will have received as confirmation of the creation of the account. Define an user ID and a password to access to the system of submission of abstracts.

Once you are logged to the site, to submit an abstract choose “New Submission”. Complete the information related to every author of the paper, specifying at least one Corresponding Author. If the abstract has more than 3 authors, use the “Click here to add more authors” option. Enter the Title and the Abstract in plain text in the reported form. This is only to help the system and the database, but the ABSTRACT MUST BE SUBMITTED AS PDF format according to this [TEMPLATE](#).

Please notice that abstract length must be limited to one A4 page as indicated in the template. Enter at least 3 keywords, one per line.

UPLOAD THE FILE WITH YOUR ABSTRACT as .pdf format and submit your abstract clicking the “Submit” button.

Once you have submitted one or more papers, you can access to your submission(s) through either the “overview” or “my submissions” menu. You can edit or add corrections or upload a new version of your abstract(s) before the abstract deadline.

#### **Confirmation of receipt and notification of decision:**

You will receive email confirmation that your abstract has been received, indicating the allocated abstract number. Please refer to this abstract number in all further correspondence regarding the abstract. Only the submitter will receive all information concerning the abstract and will be responsible for informing the other Authors of the status of the abstract. After the review by the Scientific Committee, authors will be notified about results by August 20, 2019. If an abstract is accepted, the presenting author must register and pay the registration fee by September 1, 2019.

#### **MA-XRF 2019 Special Issue of X-ray Spectrometry:**

Participants are invited to submit manuscripts based on their contributions for publication in a special issue of *X-ray Spectrometry*. Please note that all papers will be handled and reviewed as regular submissions to the journal. As such, submitted manuscripts will be subjected to the selection process of this journal, including a peer review procedure. Therefore, acceptance for presentation at the meeting is not a guarantee for publication in the journal. All manuscripts must meet the standards of the journal: they will need to show clear analytical advances on the use of MA-XRF (even in combination with other methods) in the Cultural Heritage field and they must match the scope of the journal. Accepted papers will be published individually in regular issues as soon as they are accepted. The deadline for submission of manuscripts will be published in the website of the workshop.

#### **Contacts:**

Participants are encouraged to visit the website of the meeting ([MA-XRF 2019 website](#)) or to contact the organizers ([caliri@lns.infn.it](mailto:caliri@lns.infn.it)) for updated information.

Koen Janssens  
Paolo Romano  
(On behalf of the Scientific Committee)

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**OPEN REGISTRATION FOR ADVANCED  
MASS SPECTROMETRY APPLIED TO  
CULTURAL HERITAGE BY UNIVERSITY OF  
BORDEAUX, 17<sup>TH</sup> - 21<sup>ST</sup> JUNE, 2019,  
BORDEAUX, FRANCE**

(registration deadline 30 May 2019)

**BRIEF DESCRIPTION:**

This summer school is an innovative and inter/multi-disciplinary training based on advanced mass spectrometry to decipher the complexity of cultural heritage material, i.e. artworks, archaeological and palaeological materials, via their organic macromolecular signatures uncoding (proteins, lipids, and polysaccharides).

It offers a unique opportunity to develop strong knowledge in advanced mass spectrometry within a inter and multidisciplinary program which links analytical chemists, physicists, chemists, experts in formulation, computational modeling experts, conservators, restorers and archaeologists.

This five-day course combines lectures and hands-on workshops in sample preparation, current mainstream mass spectrometry techniques and their most recent improvements, omics, and bioinformatics, all within the framework of cultural heritage.

Two training levels are offered: beginner vs. advanced

A certificate of participation will be awarded to students upon completion of the course.

**TARGET GROUP AND REGISTRATION FEE:**

The school is open to graduate students, doctoral students, post-doctoral researchers, academics and private actors in analytical and heritage sciences.

Fees: 705 euro

Fees include accommodation, weekly bus pass, course materials, coffee breaks, lunch, site visits, one group dinner and social activities. Travel costs and other expenses are not included.

**ATTENDING EXPERTS**

\*Julie Arslanoglu\*, The Metropolitan Museum of Art, USA

\*Leila Birolo, \*Univ. of Naples, Italy

\*Ilaria Bonaduce, \*Univ. of Pisa, Italy

\*Alain Brunelle, \*Sorbonne Univ. and CNRS, France

\*Enrico Cappellini, \*Natural History Museum of Denmark, and Univ. of Copenhagen, Denmark

\*Remy Chapoulie \*Univ. of Bordeaux-Montaigne and CNRS, France

\*Matthew Collins\*, Univ. of Cambridge, England and Natural History Museum of Denmark, Univ. of Copenhagen, Denmark

\*Garry Corthals, \*Univ. of Amsterdam, The Netherlands

\*J?rgen Cox, \*Max Planck Institute, Germany

\*Anne Delagnes \*Univ. of Bordeaux-Montaigne and CNRS, France

\*Nathalie Fourment, \*Ministry of Culture - Archeology, France

\*Christian Kelstrup, \*Novo Nordisk Foundation Center for Protein Research, Denmark

\*Katrien Keune, \*Rijksmuseum, The Netherlands

\*Michel Menu, \*Centre de Recherche et de Restauration des Mus?es de France, France

\*Caroline Tokarski, \*Univ. of Bordeaux and CNRS, France

\*Klaas Jan van den Berg, \*Cultural Heritage Agency of the Netherlands, The Netherlands

\*Philippe Walter, \*Sorbonne Univ. and CNRS, Paris, France

## **DESCRIPTION OF COURSES AND SOCIAL EVENTS:**

June 17th - 20th (days 1-4)

Plenary speakers, lectures and hands-on workshops. The topic covered include sample preparation for art, archaeological, and palaeological objects. Bottom-up and top-down proteomics lectures (MALDI-based and LC MS/MS). Portable and minimally invasive methods for protein analysis.

Evening poster session and flash presentations. Lipids and polysaccharides using MS. Mass spectrometry imaging. Cross-linking, interactions, chemical changes and molecular breakdowns. Bioinformatics current tools and new developments.

June 21th

All day: Advanced Mass Spectrometry in Cultural Heritage Symposium (open to external attendees)



\*More info\*: [hrms-heritage2019.org](http://hrms-heritage2019.org)

### **REGISTRATION AND DETAILED INFO:**

Applications: a CV, cover letter including details of current / past projects and two referees' names and contacts should be sent to the organization e-mail below.

Deadline: May 30th, 2019.

### **Organization & Contact**

[hrms-heritage2019-school@u-bordeaux.fr](mailto:hrms-heritage2019-school@u-bordeaux.fr)

\*Caroline Tokarski\*

[caroline.tokarski@u-bordeaux.fr](mailto:caroline.tokarski@u-bordeaux.fr)

\*All information can be found at:\*

[bss-appliedchemistry.u-bordeaux.fr](http://bss-appliedchemistry.u-bordeaux.fr)

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## **CALL FOR ABSTRACTS: DHA38 - DYES IN HISTORY AND ARCHAEOLOGY 38, 7-8 NOVEMBER 2019 AMSTERDAM**

The University of Amsterdam (UvA), the Cultural Heritage Agency of the Netherlands (RCE), the Rijksmuseum Amsterdam and the ErfgoedAcademie (HeritageAcademy) are honoured to host the 38st Dyes in History and Archaeology (DHA) conference in Amsterdam on 7 and 8 November 2019.

The Dyes in History and Archaeology (DHA) is an annual conference that focuses on the discussion of dyes and organic pigments applied in the past. This includes their history, production, application and properties, as well as their analytical characterisation and identification, mainly in textile objects, but also on painted surfaces. Every year, the meeting attracts conservators, curators, (technical) art historians, craftsmen, artists, independent scholars, scientists and academics from museums, universities, research centres and other public or private institutions. More information to be found on the website: [www.DHA38.nl](http://www.DHA38.nl)

We are now accepting abstracts for oral and poster presentations. Abstracts can be submitted to [DHA38@cultureelerfgoed.nl](mailto:DHA38@cultureelerfgoed.nl) before June 15, 2019 using the template <https://0nj8hm3.momice.events/page/572199> which can be found on the conference website: [www.DHA38.nl](http://www.DHA38.nl). Notifications on the abstracts by the 31st of July, 2019.

Registration is also open! There is a maximum of 125 places and these will be filled on a first come, first served basis. Early booking is therefore highly recommended.

Any other questions, please visit the website: [www.DHA38.nl](http://www.DHA38.nl) or send us an email on: [DHA38@cultureelerfgoed.nl](mailto:DHA38@cultureelerfgoed.nl)

Hope to see you there,

The organising committee:

Maarten van Bommel, University of Amsterdam, The Netherlands Ana Serrano, Cultural Heritage Agency of the Netherlands / University of Amsterdam Art Proa?o Gaibor, Cultural Heritage Agency of the Netherlands Suzan Meijer, The Rijksmuseum Sanne Berbers, Cultural Heritage Agency of the Netherlands

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## **“CONTRIBUTIONS OF EXPERIMENTAL ARCHAEOLOGY TO EXCAVATION AND MATERIAL STUDIES”, 25 SEPTEMBER TO 1 OCTOBER 2019, FRANCE**

We warmly invite you to the conference: “**Contributions of Experimental Archaeology to Excavation and Material Studies**”.

Please note that we have extended the **deadline for abstract submissions to 31 May 2019**.

The conference will take place from **25 September to 1 October 2019** in France. The first part encompasses thematic paper and poster sessions (at the Sorbonne Université Lettres & Université MSH Paris-Saclay, in Paris) from 25 to 27 September, while the second part consists of four days of field experimentation (in Melle).

This second meeting of the International Conference on Archaeometallurgy (ICA II) aims to highlight the value of experimental archaeology as a scientific tool to address specific research questions relating to archaeological excavation techniques and the understanding of archaeological sites and artefacts.

We welcome contributions on all archaeological subjects where a clear interaction between experimental work and either excavation or laboratory practice is demonstrated.

The organisers look forward to welcoming you for these three days of conference and four days of experiments.

For more information, abstract submission and conference registration, please visit the conference website: <https://metallurgy-ica.wixsite.com/ica2/>.  
For specific questions, please contact us at [infoica2@gmail.com](mailto:infoica2@gmail.com).

Finally, we would like to draw your attention to the recently published volume resulting from the first ICA meeting, which is now available for purchase at *éditions Mergoïl* ([website](#)).

Kind regards,

On behalf of the organising committee

Georges Verly - Musée Art et Histoire de Bruxelles, section antiquités égyptiennes  
Florian Téreygeol and Jean-Charles Méaudre - Laboratoire Archéomatériaux et Prévision de l'Altération : LMC IRAMAT UMR5060 CNRS et NIMBE UMR3685 CEA/CNRS - Université MSH Paris-Saclay  
Claire Somaglino and Adeline Bats - Sorbonne Université Lettres - CNRS Orient & Méditerranée (UMR 8167), équipe Mondes Pharaoniques  
Frederik Rademakers - KU Leuven, Department of Earth and Environmental Sciences

Johannes Auenmüller - Institut für Ägyptologie und Koptologie, Westfälische Wilhelms-Universität Münster

Roeland Paardekooper - EXARC

Jean-Philippe Marnais - Mines d'argent des Rois Francs de Melle

\*\*\*\*\*  
ir. Frederik Rademakers, PhD

KU Leuven  
Earth and Environmental Sciences  
Celestijnenlaan 200e - bus 2410  
3001 Leuven  
tel.: [+32 16 37 45 45](tel:+3216374545)  
fax: [+32 16 3 22980](tel:+3216322980)  
mail: [frederik.rademakers@kuleuven.be](mailto:frederik.rademakers@kuleuven.be)  
[kuleuven.academia.edu/FrederikRademakers](http://kuleuven.academia.edu/FrederikRademakers)

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“Contributions of Experimental Archaeology to Excavation and Material Studies”, 25 September to 1 October 2019, France

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**INTERNATIONAL CONFERENCE ON  
ARCHAOMETALLURGY (ICA II),  
“CONTRIBUTIONS OF EXPERIMENTAL  
ARCHAEOLOGY TO EXCAVATION AND  
MATERIAL STUDIES”, 25 SEPTEMBER - 1  
OCTOBER 2019, FRANCE**

Dear colleagues,

We warmly invite you to the conference: **“Contributions of Experimental Archaeology to Excavation and Material Studies”**.

Please note that we have extended the **deadline for abstract submissions to 31 May 2019**.

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\*\*\*\*\*

ir. Frederik Rademakers, PhD

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Earth and Environmental Sciences

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3001 Leuven

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fax: [+32 16 3 22980](tel:+3216322980)

mail: [frederik.rademakers@kuleuven.be](mailto:frederik.rademakers@kuleuven.be)

[kuleuven.academia.edu/FrederikRademakers](http://kuleuven.academia.edu/FrederikRademakers)

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## **2019 INTERNATIONAL AERIAL ARCHAEOLOGY CONFERENCE (AARG 2019), CONSTANTA (ROMANIA), 12-14 SEPTEMBER 2019, CALL FOR PAPERS**

Deadline: May 31st 2019!

Oral Papers (20 minutes) and Posters (A 1 portrait) are invited on the themes of:

I. Local session: Aerial Archaeology in Romania and the Black Sea region. This session features papers on aerial archaeology in Romania and especially in the area of the Black Sea. Contributions are welcome on recent research and historical applications of aerial archaeology, including case studies and more theoretical contributions.

II. Aerial Archaeology in the commercial sector Increasingly, aerial archaeology is (or perhaps should be?) an indispensable part of the planning process, and aerial methods are integral to infrastructural development worldwide. This session invites papers on any aspect of such collaborations, from successful collaborations and innovative approaches to abject failures and cautionary tales.

III. Aerial archaeology and the public

The last decade has seen the rapid democratisation of aerial archaeology, from Google Earth and Bing, to digitisation of historic collections and the development of ever cheaper and more effective drone technology. These developments have seen the ever-increasing involvement of the public with airborne and spaceborne archaeological prospection. This session invites contributions that explore the intersection between aerial archaeology and public archaeology, including case studies and critical reflections on such interactions, both successful and less successful.

IV. Revisiting the gaps: Empty spaces in the theory and practice of aerial archaeology In 2013 the University of Siena held an international seminar on ‘Emptiness, Visibility, Ambiguity and Absence in Archaeology’ – Mind the Gap. This thought-provoking meeting focused on ideas of emptiness in archaeological landscapes and asked: how do we begin to address apparent gaps in various landscapes? Do these gaps reflect real patterns of past activity, or are they methodological artefacts? How do we understand the character of the patterns of archaeological evidence derived from aerial survey? Has progress been made in addressing these gaps in theory and practice? Contributions are invited on methodological or theoretical aspects of understanding patterns of (relative) emptiness, on the character of patterns and distributions of archaeological materials in the landscape, or on methodological voids within the field of aerial archaeology.

V. Aerial Archaeology: The Next Generation In this plenary session we will hear from diverse voices from the next generation of aerial archaeologists: What does the future of aerial archaeology look like? What are the key developments in method, theory and application likely to be within the next decade? What training and skills will be needed to succeed? Will aerial archaeology remain an independent specialism, or become part of the general archaeological toolkit? Are opportunities and challenges shared across the

community or regionally varied? What are the most exciting emerging research areas? What does the community need to prioritise to attract the next generation of researchers and professionals?

\*Early Bird Registration Deadline: \* 12 th July 2019

\*Regular registration Deadline: \*August 16th 2019

Members rates available by registering to become a member via the AARG website: <https://a-a-r-g.eu/>

**All conference details, papers submission and registration forms are at:**  
<https://aarg2019.a-a-r-g.eu/>

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**I LATIN AMERICAN RADIOCARBON  
CONFERENCE, JULY 29<sup>TH</sup> - AUGUST 2<sup>ND</sup>, H  
NITERÓI HOTEL - NITERÓI - RJ, BRAZIL**

Dear Colleagues

The **CLARa 2019** Conference is getting closer and this is a reminder that the early bird registration deadline will be extended to **June 14th, 2019**

The website is open for early registration and you can find further information at <https://www.clara2019.com.br/>

The registration fee can be paid at [www.creacteve.com.br/evento/CLARA2019](http://www.creacteve.com.br/evento/CLARA2019)

Make sure to register until the deadline to secure a lower registration rate.

We look forward to welcoming you in Niteroi!

Best regards,

Organizing Committee

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## **MATERIALS TESTING SYMPOSIUM - NOV. 6, 2019 - METROPOLITAN MUSEUM OF ART, NEW YORK CITY**

The Met's Department of Scientific Research is pleased to invite you to Materials Testing for Cultural Heritage Symposium to be held at The Met in New York City on Wednesday, November 6th, 2019, from 10 AM to 5 PM.

The symposium will cover recent developments in materials selection methods and both advanced and traditional materials testing tools. Many institutions continue to rely on the Oddy test while others utilize advanced analytical methodologies such as gas and liquid chromatography to assess materials. With several institutions utilizing volatiles analysis as a rapid tool for assessing materials to be used in the display, storage, or transport of art, we hope to cover the state of the art in our field and encourage discussion about what is needed to improve our ability to accurately evaluate this broad array of materials for those with and without advanced analytical capabilities.

Please RSVP to Eric Breitung at: [breite@metmuseum.org](mailto:breite@metmuseum.org) to reserve a space. There will not be a registration fee, as support for this symposium was provided by the Institute of Museum and Library Services. Program details and logistics will be shared with all attendees shortly.

Please RSVP no later than Tuesday, August 1st, 2019.

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**ΠΡΟΣΚΛΗΣΗ ΣΥΜΜΕΤΟΧΗΣ ΣΤΟ 3Ο**  
**ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΨΗΦΙΟΠΟΙΗΣΗΣ**  
**ΠΟΛΙΤΙΣΤΙΚΗΣ ΚΛΗΡΟΝΟΜΙΑΣ 2019 - (3ND**  
**PAN-HELLENIC CONFERENCE ON DIGITAL**  
**CULTURAL HERITAGE-EUROMED 2019),**  
**ΑΘΗΝΑ - 25,26 ΚΑΙ 27 ΣΕΠΤΕΜΒΡΙΟΥ 2019,**  
**ΠΑΝΕΠΙΣΤΗΜΙΟ ΔΥΤΙΚΗΣ ΑΤΤΙΚΗΣ-**  
**ΠΑΝΕΠΙΣΤΗΜΙΟΥΠΟΛΗ 2**

Όλες οι λεπτομέρειες στο [www.euromed-dch.eu](http://www.euromed-dch.eu)

Σας προσκαλούμε να συμμετάσχετε στο 3ο ΣΥΝΕΔΡΙΟ ΨΗΦΙΟΠΟΙΗΣΗΣ ΠΟΛΙΤΙΣΤΙΚΗΣ ΚΛΗΡΟΝΟΜΙΑΣ-EuroMed 2019, που έχει θεσμοθετηθεί και διοργανώνεται στην Ελλάδα κάθε δύο (2) χρόνια, μετά από απόφαση των διοργανωτών Φορέων, που είναι το Τεχνολογικό Πανεπιστήμιο Κύπρου (ΤΕ.ΠΑ.Κ.- Εργαστήριο Ψηφιακής Πολιτιστικής Κληρονομιάς (UNESCO Chair on Digital Cultural Heritage και EUERA Chair on Digital Cultural Heritage), το Πανεπιστήμιο Δυτικής Αττικής (Εργαστήριο του Τμήματος Μηχανικών Βιομηχανικής Σχεδίασης και Παραγωγής-Σχολή Μηχανικών) και ο Ελληνικός Πολιτιστικός Οργανισμός "Δίκτυο ΠΕΡΡΑΙΒΙΑ" .

Το Συνέδριο τελεί υπό την Αιγίδα της Α.Ε. του Προέδρου της Δημοκρατίας κυρίου Προκοπίου Παυλοπούλου και της Α.Θ. Παναγιώτητος του Οικουμενικού Πατριάρχου Κωνσταντινουπόλεως κ.κ. Βαρθολομαίου και υποστηρίζονται από πολλά Υπουργεία και παγκόσμιους επιστημονικούς Οργανισμούς.

Στα πλαίσια του Συνεδρίου προσκαλείται όλη η επιστημονική και ερευνητική κοινότητα, από την Ελλάδα και την Κύπρο, αλλά και Έλληνες και Κύπριοι ερευνητές ανά την υφήλιο, να δηλώσουν συμμετοχή τους ως Συνέδρων, αλλά και να υποβάλλουν τις εισηγήσεις και τα Posters τους, μέσω της επίσημης ιστοσελίδας του Συνεδρίου [www.euromed-dch.eu](http://www.euromed-dch.eu), αφού το γεγονός αυτό αποτελεί τη μεγάλη συνάντηση της Επιστήμης με τον Ελληνικό Πολιτισμό, με κέντρο την παιδεία, την έρευνα, την καινοτομία, τις ψηφιακές τεχνολογίες και τον πολιτιστικό τουρισμό, αξιοποιώντας την παγκόσμια απήχηση και σεβασμό που τρέφει η παγκόσμια κοινότητα στον Ελληνικό Πολιτισμό, που πρέπει να έχει τη θέση που του αξίζει.

Ιδιαίτερα, μετά και τη μεγάλη καταστροφή στο παγκόσμιο μνημείο πολιτιστικής κληρονομιάς, της Παναγίας των Παρισίων ,αλλά και τόσων άλλων μνημείων αυτά τα χρόνια , αναδεικνύεται η αξία και η σημασία της διοργάνωσης τέτοιων επιστημονικών Συνεδρίων ,που αναδεικνύουν την καινοτομία , την έρευνα ,τις Νέες Τεχνολογίες και την μεγάλη προσπάθεια της επιστημονικής κοινότητας για τη διάσωση του Πολιτιστικού Αποθέματος του Ανθρώπου.

**Θεματικοί άξονες Συνεδρίου:**

- *Νέες τεχνολογίες στις ανθρωπιστικές επιστήμες*
- *Η ψηφιοποίηση στην Αρχαιολογία και τον τουρισμό*
- *Ψηφιακή Πολιτιστική κληρονομιά και η διαχείριση της*
- *Συντήρηση, Προστασία και ανάδειξη της πολιτιστικής κληρονομιάς στο ψηφιακό πολυμεσικό περιβάλλον και διαδίκτυο (Εκπαίδευση, Τουρισμό, κτλ)*
- *Νομικό πλαίσιο και ψηφιοποίηση της Πολιτιστικής Κληρονομιάς (συμβάσεις, προγράμματα, πνευματικά δικαιώματα κ.ά.)*
- *Εμπειρίες, νέες προκλήσεις και προοπτικές για την ψηφιακή κοινωνία της Πολιτιστικής Κληρονομιάς.*

Πληροφορίες: Δίκτυο "ΠΕΡΡΑΙΒΙΑ" -Κων. Σκριάπας Τηλέφ. 6974-881944,  
[skriapask@gmail.com](mailto:skriapask@gmail.com).

ΠΛΗΡΟΦΟΡΙΕΣ για τα προηγούμενα συνέδρια στην Ελλάδα στα εξής Links:  
[www.euromed2015.eu](http://www.euromed2015.eu),  
[www.euromed2017.eu](http://www.euromed2017.eu),

**Με Εκτίμηση**  
**ΓΙΑ ΤΟΥΣ ΔΙΟΡΓΑΝΩΤΕΣ ΦΟΡΕΙΣ**

ΤΕΧΝΟΛΟΓΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΥΠΡΟΥ-ΠΑΝΕΠΙΣΤΗΜΙΟ ΔΥΤΙΚΗΣ  
ΑΤΤΙΚΗΣ-ΔΙΚΤΥΟ "ΠΕΡΡΑΙΒΙΑ"

**Η Οργανωτική Επιτροπή του Συνεδρίου**

- ΜΑΡΙΝΟΣ ΙΩΑΝΝΙΔΗΣ -Καθηγητής Πανεπιστημίου ΤΕΠΑΚ-ΚΥΠΡΟΣ
- ΘΕΟΔ.ΓΚΑΝΕΤΣΟΣ- Καθηγητής Πανεπιστημίου Δυτικής Αττικής
- ΙΩΑΝΝΗΣ ΒΑΡΑΛΗΣ-Επικ. Καθηγητής Πανεπιστημίου Θεσσαλίας ,
- ΗΛΙΑΣ ΝΟΜΠΙΛΑΚΗΣ -τ. Αν. Καθηγητής πρ.ΤΕΙ Αθηνών ,

ΚΩΝ/ΝΟΣ ΣΚΡΙΑΠΑΣ -Οικονομολόγος -Σύμβουλος Ανάπτυξης-Δίκτυο  
"ΠΕΡΡΑΙΒΙΑ"- ΕΛΛΑΔΑ

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

**DIRECTOR OF APPLIED RESEARCH AND**  
**OUTREACH, INSTITUTE FOR THE**  
**PRESERVATION OF CULTURAL HERITAGE,**  
**YALE UNIVERSITY**

Reporting to the Director of the Institute for the Preservation of Cultural Heritage (IPCH), the Director of Applied Research and Outreach will work with IPCH leadership to develop programs that link IPCH and Yale expertise with heritage communities worldwide. This position will forge collaborations among Yale scholars and international partners to promote the preservation, interpretation, and value of material cultural heritage. The successful applicant will conceive and execute innovative educational and professional development programming, with a particular focus on countries outside of North America and Europe. The Director of Applied Research and Outreach will participate in the development of the IPCH strategy that will foster a meaningful exchange between conservation research and practice.

**Essential Duties:**

1. Working closely with the IPCH leadership, develop innovative educational programs and professional development opportunities that leverage the expertise of IPCH and Yale to build, strengthen, and sustain the capacity of heritage communities worldwide. Such programs should involve: translating the findings of the IPCH labs into practice; promoting best practices and research methodologies for problem-solving at the local level; and developing novel training programs in host countries and at Yale, with a focus on partnerships in countries outside of North America and Europe.
2. Participate in the development of an IPCH strategy that will link core expertise and research programs with opportunities for engaging internal and external partners.
3. Disseminate the findings of the various labs into practice by developing training programs worldwide to include online courses, seminars, and workshops in host countries and at Yale.
4. Develop and maintain strong relationships with key partners in host countries to facilitate projects of mutual interest and significant impact.
5. Help shape and implement IPCH External Programming, develop and maintain strong relationships within Yale, including with faculty, stakeholders in Yale's museums and collections, and Yale's Office of International Affairs. Other partners would include the Smithsonian Institution and the Global Consortium for the Preservation of Cultural Heritage.

6. Oversee and provide stewardship for the Arcadia Fund's transformative gift to Yale University.
7. Develop partnerships and programs according to established Yale policies, procedures, and guidelines in consultation with the Yale Office of International Affairs and other offices as appropriate.
8. Develop and manage a budget and personnel plan for executing the external programs.
9. May manage staff of exempt and non-exempt employees.

**Education and Experience:**

1. PhD in a related field and five years of experience in a cultural heritage and preservation environment such as academia, museum, collections, public or private research institute, or similar institution; or an equivalent combination of education and experience.
2. Experience working with international partners.
3. Experience planning and executing education and dissemination programs.
4. Project management experience with a proven track record of completion on time.
5. Supervisory experience with technical and/or professional staff demonstrating high-level management and interpersonal skills.
6. A record of membership of appropriate professional bodies, participation in and contribution to conferences and workshops.

**Skills:**

1. Effective strategic planning and program leadership skills. Well-developed organizational, problem-solving, teaching and supervisory skills within complex environments where relationship building and influencing skills are key.
2. Strong oral and written communication skills, particularly the cultural empathy required for engaging with international audiences.
3. Demonstrated ability to work collegially with a wide range of staff.
4. Ability to affect the translation of research findings into practice.
5. Proven ability to work with complex issues and manage multiple conflicting deadlines.

**Preferred Education, Experience and Skills:**

Experience working with sponsors, particularly the stewardship of charitable gifts. Advanced knowledge of conservation ethics, principles, techniques, and procedures as relating to cultural property.

Applications being accepted through June 15, 2019.

For more information and the application process visit: <http://bit.ly/YaleCareers-55295BR><<https://nam05.safelinks.protection.outlook.com/?url=http%3A%2F%2Fbit.ly%2FYaleCareers-55295BR&data=02%7C01%7Cian.mcclure%40yale.edu%7C7bfe4028044f4f4a4cb008d6c9e8609c%7Cdd8cbabb21394df8b4114e3e87abeb5c%7C0%7C0%7C636918397282361618&sdata=qZJoQTp1fmctBkrZHSBUXm8a3IA9J9BxpkNNGu%2BbwDA%3D&reserved=0>.

Ian McClure  
Interim Director

Susan Morse Hilles Chief Conservator  
Yale University Art Gallery

Please visit the site: <https://ipch.yale.edu/>

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**PHD STUDENTSHIP, NATIONAL GALLERY,  
LONDON AND IMPERIAL COLLEGE LONDON -  
'MULTIMODAL ANALYTICAL IMAGING OF OLD  
MASTER PAINTINGS: ADDRESSING THE  
CHALLENGES OF REGISTRATION, MOSAIC  
CONSTRUCTION AND IMAGE RESOLUTION',  
AHRC COLLABORATIVE DOCTORAL  
PARTNERSHIP, RESEARCH STUDENTSHIP 2019,  
THE NATIONAL GALLERY, SCIENTIFIC  
DEPARTMENT & IMPERIAL COLLEGE, LONDON**

Multimodal analytical imaging of Old Master Paintings: addressing the challenges of registration, mosaic construction and image resolution

Applications are invited for a Collaborative Doctoral Partnership PhD studentship, to be undertaken at Imperial College London (Electrical and Electronic Engineering Department) and the National Gallery (Scientific Department). This studentship will be jointly supervised by Professor Pier Luigi Dragotti at Imperial College London (ICL) and Dr Catherine Higgitt at the National Gallery (NG). The studentship is for a three-year (full-time) project entitled 'Multimodal analytical imaging of Old Master Paintings: addressing the challenges of registration, mosaic construction and image resolution', to commence on 1 October 2019. The student may also apply to the Student Development Fund (see below) to allow a (remunerated) placement of up to 6 months duration at the National Gallery during the PhD to further develop and expand their skills. The student will spend concentrated periods of time both at Imperial College London and at the National Gallery. This is an exciting interdisciplinary project involving close collaboration between engineers with expertise in signal and image processing, conservation scientists, conservators and curators. The student will also have the opportunity to interact with researchers involved in an EPSRC-funded joint-research project between ICL, NG and University College London (<http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/R032785/1>).

**Summary of Project:**

In the art historical study of paintings and to inform their conservation, there is a long tradition of using a range of imaging techniques to improve understanding of an artist's creative process, working methods, palette and materials. These techniques range from visible images under different lighting or magnification, images acquired using different forms of radiation e.g. infrared reflectograms or X-radiographs, to image sets generated using new spectroscopic imaging methods like macro X-ray fluorescence scanning (MA-XRF) or hyperspectral imaging (HSI). However, to harness the wealth of information contained within these very large multi-modal datasets, an essential first step is to accurately align the images. Registration and mosaicking normally involves finding common, invariant features between images and aligning the images using these 'control points'. However, with paintings, each modality may contain both similar and unique



features making registration particularly challenging. Various approaches have been developed for registration of multimodal data from paintings but may fail if the spatial resolution of the data differs (e.g. MA-XRF data) and are not automatic (important when handling very large HSI and MA-XRF datasets increasingly available in the field) nor invariant to geometric transformation and colour-inconsistency.

This project aims to facilitate processing and interpretation of multimodal datasets from paintings by developing new registration methods to automatically extract features common to different modalities that are resilient to variation in acquisition conditions, spatial resolution and geometric distortions, etc. The project will also develop methods to enhance the spatial resolutions of some of the modalities which normally have a resolution which is much smaller than that of the visible image and will achieve that by leveraging correlation among modalities. Performance will be bench-marked against current approaches. The optimised algorithms will both enhance spatial resolutions of low resolution modalities and automatically register and mosaic multimodal images and will be packaged as open-source user-friendly software tools to allow wide adoption by and adaptation for a variety of arts and humanities end-users, greatly facilitating use of the numerous and diverse technical images now generated in their research.

Such tools, besides facilitating registration specifically, will assist more in-depth data interpretation by identifying features unique to a modality which may relate to concealed/altered features in a painting. By improving our ability to extract and visualise information contained within multimodal image sets, this research opens up the possibility to gain unprecedented insights into the creation, history and condition of Old Master paintings whilst also offering the possibility of providing new ways to interact with art and to present it on modern media devices to provide new experiences. The methods will be applicable to a wide range of image modalities and will both improve on current practice and be an essential pre-requisite to the broader use of advanced signal processing methods in the cultural heritage sector in order to fully exploit the rich variety of digital data now being generated. The results obtained are expected to stimulate further broader exploration of such methods in the arts and humanities field.

#### **Funding:**

This Collaborative Doctoral Partnership PhD studentship is funded by the AHRC. The full studentship award for students with UK residency\* includes fees and a stipend of approximately ?16,000 per annum plus approximately ?500 p.a. additional stipend payment for Collaborative Doctoral students for 3 years. In addition, the Student Development Fund (equivalent to 0.5 years of stipend payments) is also available to support the cost of training, work placements, and other development opportunities. Students with EU residency are eligible for a fees-only studentship award. International applicants are normally not eligible to apply for this studentship. The student will receive additional support towards further research expenses from The National Gallery over the course of the research studentship. When appropriate, further support to attend conferences will be provided by Imperial College London. Both partners and the CDP consortium will provide opportunities for training and career development.

\*UK residency means having settled status in the UK that is no restriction on how long you can stay in the UK; and having been "ordinarily resident" in the UK for 3 years prior to the start of the studentship that is you must have been normally residing in the UK

apart from temporary or occasional absences; and not been residing in the UK wholly or mainly for the purposes of full-time education.

**Eligibility:**

Applicants must have a good first degree (usually a minimum 2:1) or a Masters degree (or other equivalent experience) in Electrical/Electronic Engineering, Mathematics, Physics or related areas. They should be highly motivated individuals with a keen interest in conducting interdisciplinary research. The project would suit a candidate with an interest in developing cutting-edge scientific techniques and complex data processing methods to challenging questions such as those posed by cultural heritage sector. Students must also meet the eligibility requirements for Post Graduate Studies at Imperial College London.

**Further Information and application:**

Interested applicants should contact the main supervisors Professor Pier Luigi Dragotti ([p.dragotti@imperial.ac.uk](mailto:p.dragotti@imperial.ac.uk)) and Dr Catherine Higgitt ([catherine.higgitt@ng-london.org.uk](mailto:catherine.higgitt@ng-london.org.uk)) ideally by 15th June 2019 and they should include in the email a covering letter and their CV.

\*\*\*\*\*

Dr Catherine Higgitt

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\*\*\*\*\*

[The National Gallery, Trafalgar Square, London WC2N 5DN]  
<http://www.nationalgallery.org.uk> [Mantegna and Bellini]  
<https://www.nationalgallery.org.uk/whats-on/exhibitions/sorolla>

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**ΑΝΑΚΟΙΝΩΣΕΙΣ - ANNOUNCEMENTS**  
**CALLS FOR CONTRIBUTIONS: TO THE**  
**"ARCHAEOLOGY OF FOOD AND**  
**FOODWAYS"**

We invite your article submissions to a new international refereed journal for 2020, Archaeology of Food and Foodways, showcasing original scholarly work on the relationship between human sustenance and society.

This publication foregrounds the dynamics between food and culture, food and environment, and shifts in foodways over time, covering time periods from prehistory through the 19th century. We encourage the submission of original work by archaeologists, historians, Classicists, and other scholars who address methodologies, theories, historical trajectories, cross-cultural comparisons, and controversies surrounding material culture and past foodways.

We also encourage the submission of work by scholars and other specialists who have applied archaeological findings to such domains as public policy, culinary arts, and dietary regimes.

Editors Shanti Morell-Hart (McMaster), Erica Rowan (Royal Holloway), and Shinya Shoda (Nara Institute).  
Publisher Equinox.

Editorial Inquiries: [AFFeditors@equinoxpub.com](mailto:AFFeditors@equinoxpub.com)

Please visit the site: <https://journal.equinoxpub.com/index.php/AFF/index>

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## **ADVANCED SHORT TRAINING COURSES IN STRUCTURAL ANALYSIS OF EXISTING BUILDINGS, MONUMENTS AND HISTORICAL CONSTRUCTIONS**

Dear Colleagues,

Please find below information about Advanced short Training Courses in Structural Analysis of Existing Buildings, Monuments and Historical Constructions.

I kindly invite you to disseminate this information to anybody who could be interested in applying.

The courses integrated in the SAHC Master Course ([www.msc-sahc.org](http://www.msc-sahc.org)) can now be attended separately, without the need to enroll in the Master Course.

These courses are of interest to those interested in the conservation, repair and strengthening of the built heritage, be it monuments, other cultural heritage buildings or existing buildings in general. This includes mainly civil engineers and architects, but also, for some courses, art historians, archaeologists and other interested in cultural heritage buildings, interested in complementing or updating their knowledge with the most recent professional and scientific approaches and techniques.

The attendants can be professionals such as consultants, employees in building contractors, building material producers and suppliers, heritage authorities and others, as well as graduate students (MSc or PhD) enrolled in other programs.

Detailed information can be found in the leaflet (downloadable at [www.msc-sahc.org/upload/docs/Advanced\\_Training\\_Courses\\_SAHC.pdf](http://www.msc-sahc.org/upload/docs/Advanced_Training_Courses_SAHC.pdf)) or by visiting the webpage at [www.msc-sahc.org](http://www.msc-sahc.org).

**For further information, please contact the Secretariat at [secretariat@msc-sahc.org](mailto:secretariat@msc-sahc.org).**

\* \* \* \* \*

Yours sincerely,

Paulo B. Lourenco

*Courses Coordinator*

*Editor of the International Journal of Architectural Heritage: Conservation, Analysis, and Restoration*

*Advisor of the International Conference Series on Structural Analysis of Historical Constructions*

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

# **ISOLATION AND CHARACTERIZATION OF LIVE YEAST CELLS FROM ANCIENT VESSELS AS A TOOL IN BIO- ARCHAEOLOGY**

Tzemach Aouizerat, Itai Gutman, Yitzhak Paz, Aren M. Maeir, Yuval Gadot, Daniel Gelman, Amir Szitenberg, Elyashiv Drori, Ania Pinkus, Miriam Schoemann, Rachel Kaplan, Tziona Ben-Gedalya, Shunit Copenhagen-Glazer, Eli Reich, Amijai Saragovi, Oded Lipschits, Michael Klutstein, Ronen Hazan Daniel Barkan, Editor

### **ABSTRACT**

Ancient fermented food has been studied based on recipes, residue analysis, and ancient-DNA techniques and reconstructed using modern domesticated yeast. Here, we present a novel approach based on our hypothesis that enriched yeast populations in fermented beverages could have become the dominant species in storage vessels and their descendants could be isolated and studied today. We developed a pipeline of yeast isolation from clay vessels and screened for yeast cells in beverage-related and non-beverage-related ancient vessels and sediments from several archaeological sites. We found that yeast cells could be successfully isolated specifically from clay containers of fermented beverages. The findings that genotypically the isolated yeasts are similar to those found in traditional African beverages and phenotypically they grow similar to modern beer-producing yeast strongly suggest that they are descendants of the original fermenting yeast. These results demonstrate that modern microorganisms can serve as a new tool in bio-archaeology research.

**IMPORTANCE** So far, most of the study of ancient organisms has been based mainly on the analysis of ancient DNA. Here we show that it is possible to isolate and study microorganisms—yeast in this case—from ancient pottery vessels used for fermentation. We demonstrate that it is highly likely that these cells are descendants of the original yeast strains that participated in the fermentation process and were absorbed into the clay matrix of the pottery vessels. Moreover, we characterized the isolated yeast strains, their genomes, and the beer they produced. These results open new and exciting avenues in the study of domesticated microorganisms and contribute significantly to the fields of bio- and experimental archaeology that aim to reconstruct ancient artifacts and products.

Please visit the site: <https://mbio.asm.org/content/10/2/e00388-19>> is posted this article. Go there for full text

# **THE ANCIENT HARBOURS OF THE PIRAEUS: VOLUME II. ZEA HARBOUR: THE GROUP 1 AND 2 SHIPSHEDS AND SLIPWAYS - ARCHITECTURE, TOPOGRAPHY AND FINDS**

Monographs of the Danish Institute at Athens, Volume 15,3 [Hardback]

Bjørn Lovén (Author); Yannis Sapountzis (Author)

Euro: 67.11

ISBN: 978 87 7184 802 1 | Published by: Aarhus University Press | Series: Monographs of the Danish Institute at Athens | Year of Publication: 2018 | Language: English 221p, 37figs, 32plates (H275 x W435 mm). H280 x W232 (mm)

## **Details**

Volume 15, 3: Architecture, Topography, Finds. Expanding on the publication of the shipsheds and slipways found in the northern half of Group 1 (Area 1) on the eastern side of Zea Harbour in Volume I.1–2 (2011) of the peer-reviewed Ancient Harbours of the Piraeus series, Volume II presents further results of the archaeological investigations conducted by the Zea Harbour Project (ZHP) in 2004-2010 and 2012 of ancient shipsheds and slipways in Zea Harbour (Pashalimani), both identified and possible, making them the best documented structures in Athens' naval bases and in the wider Mediterranean. Approximately half of Volume II is devoted to the remains of shipsheds and possible shipsheds in the southern half of Group 1 (Area 2), while studies of structures identified as wide unroofed slipways in Group 2 (Area 3) on the south-eastern side of the same harbour basin occupy the balance of the book.

After Chapter 1's introduction to terminology and methodology.

Chapter 2 presents the architecture of the shipsheds and possible shipsheds found in the southern half of Group 1 (Area 2), along with the arrangement and topography of this massive naval complex, which in the 4th century BC covered between 11,630 m<sup>2</sup> and 11,989 m<sup>2</sup>.

Chapter 3 examines and catalogues the ceramics and other small finds discovered in the same area, discussing their excavation contexts, composition, and chronological significance.

Chapter 4 focuses on the architecture and topography of seven wide, unroofed slipways found in Group 2 in the northern part of Area 3 that represent a building type previously unknown in the Piraeus, probably designed either for a larger warship known as the penteres ('five'), introduced into the Athenian navy between 329/8 BC and 326/5 BC, or for a larger Hellenistic-period warship type.

Chapter 5 analyses and catalogues the ceramic small finds recovered during the excavation of the structures featured in Chapter 4.

Chapter 6 presents the new evidence regarding relative sea-level change in the harbours of Zea and Mounichia and its impact on the reconstructed lengths and layouts of the slipways and shipsheds at Zea in Group 1 (Areas 1–2) along with the wide slipways of Group 2, including greater accuracy in the recalculated lengths of the Group 1 shipsheds and slipways presented in Volume I; furthermore, it reaffirms the validity of the ZHP’s methodology and published results in relation to shipsheds around the Mediterranean.

Chapter 7 recapitulates the authors’ topographical, architectural, and chronological conclusions regarding the complexes at Zea and Mounichia, which contain the only identifiable shipsheds for triremes anywhere in the ancient world. Descriptive catalogues of the Area 2 and 3 quarries and Area 2 trenches (Appendices 1–2), Figures, and Plates complete the volume.

Fieldwork, research and publication financed by the Carlsbergfondet

The following people have documented the data presented in this book - under perhaps the most difficult conditions in the history of the field:

Anne Hooton, Brian Klejn-Christensen, Mads Danger Nielsen, Matt McCallum, Dimitris Kourkoumelis, Panos Athanasopoulos, Benoit van Santvoort, Sigrid Eliassen, Mette Kjær Schaldemose, Mette Schmidt Hvelplund, Triantafillidis Ioannis, Dina Vafeiadou, Vassilis Tsiarris, Dan Davis, Matej Školc, Niels Bargfeldt, Xanthie Argiris, Mette Arenfeldt Christensen, Yannis Nakas, Eva Mortensen, Richard Conrad Anderson

Please visit the site:

**Please visit the site: [https://en.unipress.dk/udgivelser/a/the-ancient-harbours-of-the-piraeus/?fbclid=IwAR21kHebf-duSxgBoeABrWCqZbFFJ9\\_JStWdx26Gnqi\\_p9Aaw0zegGbEiwY](https://en.unipress.dk/udgivelser/a/the-ancient-harbours-of-the-piraeus/?fbclid=IwAR21kHebf-duSxgBoeABrWCqZbFFJ9_JStWdx26Gnqi_p9Aaw0zegGbEiwY)**

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**THE IDENTITY OF POTTERS IN EARLY STATES: DETERMINING THE AGE AND SEX OF FINGERPRINTS ON EARLY BRONZE AGE POTTERY FROM TELL ES-SÂFI/GATH, ISRAEL. JOURNAL OF ARCHAEOLOGICAL METHOD AND THEORY**

Fowler, K. D., Walker, E., Greenfield, H. J., Ross, J., and Maeir, A. M. 2019.  
<https://doi.org/10.1007/s10816-019-09419-9>.

Journal of Archaeological Method and Theory pp 1–43| The Identity of Potters in Early States: Determining the Age and Sex of Fingerprints on Early Bronze Age Pottery from Tell es-Şâfi/Gath, Israel

Authors Authors and affiliations

Kent D. Fowler, Elizabeth Walker, Haskel J. Greenfield, Jon Ross, Aren M. Maeir

**Abstract**

The organization of craft production has long been a marker for broader social, economic, and political changes that accompanied urbanism. The identity of producers who comprised production groups, communities, or workshops is out of reach using conventional archaeological data. There has been some success using epidermal prints on artifacts to identify the age and sex of producers. However, while age estimates are well developed, determining the sex of ancient potters is complicated by similarities between the prints of adult women and adolescents of either sex. Forensic research indicates that a combination of ridge breadth and density would best identify the age and sex of individuals. To this end, we propose an identification framework to classify fingerprints grounded in experimental and forensic research. In this study, we classify 38 fingerprints on Early Bronze Age (EB) III pottery from the early urban neighborhood at Tell es-Şâfi/Gath, Israel. Mean ridge breadth (MRB) and mean ridge density (MRD) are used to distinguish the age and sex of prints after accounting for the shrinkage of calcareous fabrics used to make four type of vessels. We apply a modified version of the Kamp et al. (1999) regression equation to the MRB for each individual print. The MRD data are correlated to comparable data from populations with appropriate ancestry to infer sex. When the results are combined, our analyses indicate that two thirds of the fingerprints were likely made by adult men and teenage boys and the remainder by adult women and adolescent girls. This result suggests that men or women were not exclusively making pottery at early urban centers in the Levant. This pattern contrasts a fingerprint study of post-state urban pottery production during the EB in northern Mesopotamia, which suggested women no longer made pottery after cities and states were established in the region.

**Acknowledgments**

The authors thank the staff and many volunteers on the Tell es-Şâfi/Gath Archaeological Project. KF and EW would like to thank the volunteers who provided prints for the pilot



study that assessed the methods. Special thanks must be extended to Shira Albaz for her unstinting patience and efforts in cataloging Area E pottery and sharing data on the Early Bronze typology for the Tell eṣ-Şâfi/Gath assemblage. Infrastructure and funding for the research was through the Social Sciences and Humanities Research Council of Canada (410-2009-1303 to HG and 895-2011-1005 to HG and AM), The University of Manitoba, St. Paul's College, Bar-Ilan University, and a University of Manitoba Undergraduate Research Award to EW.

Please visit the site: <https://link.springer.com/article/10.1007%2Fs10816-019-09419-9>

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## **EΙΔΗΣΕΙΣ - NEWS RELEASE**

# **ANCIENT GREEK MURDER VICTIM DIED WITH WEIRDLY PERFECT CIRCLE IN CHEST, BY LAURA GEGGEL**

About 2,000 years ago, a heavily muscled man was murdered on a Greek island. The killer drove a seven-pointed spear into the man's chest with such force that it left a nearly perfect circle in his sternum, a new study finds.

Such an injury is rare, said study researcher Anagnostis Agelarakis, a professor of anthropology at Adelphi University in Garden City, New York.

"In my 40 years that I am in the field, I never found something like that," Agelarakis told Live Science. "The way that the [spear's] penetration took place in [reference] to the bone, it is an exact 90-degree angle against the sternum." [Photos: Ancient Greek Burials Reveal Fear of the Dead]

In other words, the ancient spear — known as a styrax, the pointed end of a thrusting spear — wasn't thrown at the victim from a distance.

Instead, it was likely thrust inward at close range and done with precision, possibly for an execution, Agelarakis said. An injury like that would have caused cardiac shock and arrest, likely killing the man within 1 minute, Agelarakis said.

Archaeologists found the man's remains in 2002 while excavating a section of an ancient necropolis in Thasos, the northernmost Aegean island. In all, the researchers found the remains of 57 people there.

This discovery included the man with the nearly perfect hole in his sternum, who was buried in a "conspicuous limestone cyst [a coffin-like stone box] grave of the Hellenistic period," Agelarakis wrote in the study.

### **Muscular man**

The man was tall for the time period, standing about 5 feet, 7 inches (170.5 centimeters) when he was alive, an anatomical analysis showed.

A dental examination revealed that the man was at least 50 years old when he died. Moreover, by studying the marks left by muscles on the bones, Agelarakis determined that the man was muscular during his life.

It's impossible to say how this man became so buff, but it appears he was physically active throughout his life. "He could have easily been somebody who was exercising in the gym, in the palestra," Agelarakis said. It's likely the man also spent ample time swimming and running or even working on tasks relating to the navy, Agelarakis said.

However, all of these movements, especially repetitive ones, took a toll, as the man's remains showed signs of joint pain and inflammation known as spondyloarthritis, as well as osteoarthritis, Agelarakis said.

### **Perfect hole**

The most intriguing aspect of the skeleton was the hole in the sternum, Agelarakis said. At first, the researcher wondered if it was sternal foramen, a developmental condition that affects about 5% of the modern population, when the sternum doesn't completely form. But the approximately 0.6 by 0.4-inch hole (1.5 by 1.1 cm) wasn't a developmental glitch, but rather a feature created via "penetrating trauma" — likely by a seven-sided styra, Agelarakis wrote in the study.

With the help of his wife, Argiro Agelarakis, a scientific illustrator and anthropologist who is also at Adelphi, as well as the Adelphi art department, Agelarakis had a few replica seven-sided styra weapons made out of bronze alloy.

Agelarakis found that when he threw the replicas, they didn't make a perfect circle when they hit their targets, because of the parabolic path they took while flying through the air. So, the styra likely wasn't thrown at the man, Agelarakis said.

Likewise, the man probably wasn't attacked during a battle or fight, because he would have likely flinched when hit, and this would have made the injury different — that is, not a perfect circle. In all likelihood, the man was likely immobilized — either standing against a wall, kneeling with his hands tied behind his back or lying on his back on the ground — before the styra was driven into his chest, probably for an execution, Agelarakis said. [In Photos: Spartan Temple and Cultic Artifacts Discovered]

"I concluded that it wasn't something that was hurled but [that] it was something that was steadied first on the sternum and then, with extreme force, penetrated," Agelarakis said.

A few experiments with the physics department at Adelphi University showed that extreme force would have been needed to pierce the man's bone — a force exceeding 2,200 newtons, which is equivalent to about 500 lbs. (227 kilograms) of weight.

It's unclear why the man was executed, but it was probably during a time of political upheaval, perhaps one following military turmoil or reprisals during a regime change, Agelarakis said. A dental analysis showed that just before the man's death, his diet worsened, suggesting that he was a prisoner or captive in his last days, Agelarakis said.

The ancient bones are now being held at the Archaeological Museum of Thasos. The study will be published in a forthcoming issue of *Access Archaeology*.

**Please visit the site: <https://www.livescience.com/65305-murder-mystery-ancient-greece.html> [Go there for pix]**

## **STUDY SAYS ANCIENT ROMANS MAY HAVE BUILT “INVISIBILITY CLOAKS” INTO STRUCTURES - FOUNDATIONAL PATTERNS IN ROMAN THEATERS RESEMBLE ELECTROMAGNETIC CLOAKING DEVICES, BY JENNIFER OUELLETTE**

Scientists are hard at work developing real-world "invisibility cloaks" thanks to a special class of exotic manmade "metamaterials."

Now a team of French scientists has suggested in a recent preprint on the physics arXiv that certain ancient Roman structures, like the famous Roman Colosseum, have very similar structural patterns, which may have protected them from damage from earthquakes over the millennia.

Falling within the broader class of photonic band gap materials, a "metamaterial" is technically defined as any material whose microscopic structure can bend light in ways it doesn't normally bend.

That property is called an index of refraction, i.e., the ratio between the speed of light in a vacuum and how fast the top of the light wave travels. Natural materials have a positive index of refraction; certain manmade metamaterials—first synthesized in the lab in 2000—have a negative index of refraction, meaning they interact with light in such a way as to bend light around even very sharp angles.

That's what makes metamaterials so ideal for cloaking applications—any "invisibility cloak" must be able to bend electromagnetic waves around whatever it's supposed to be cloaking. (They are also ideal for making so-called "super lenses" capable of seeing objects at much smaller scales than is possible with natural materials, because they have significantly lower diffraction limits.) Most metamaterials consist of a highly conductive metal like gold or copper, organized in specific shapes and arranged in carefully layered periodic lattice structures.

When light passes through the material, it bends around the cloaked object, rendering it "invisible." You can see anything directly behind it but never perceive the object itself.

Unlike Harry Potter's invisibility cloak, metamaterials really do exist, at least in the laboratory, but they are typically limited to specific wavelengths: microwaves, for example, or infrared light, and even certain frequencies of sound waves. Getting them to work with visible light is a much tougher challenge, although in 2017, French physicists demonstrated a proof-of-principle metamaterial using thin layers of gallium nitride (the blue light-emitting element in LCDs) carved into pillars of varying shapes to delay the flow of visible light through the material. Metamaterials also sometimes cast a telltale shadow, since they do absorb some of the light shining through them.

It may also be possible to use metamaterials to lessen the damage caused to buildings and other infrastructure from earthquakes, by redirecting so-called Rayleigh waves, the more shallow, surface seismic waves that typically inflict the worst structural damage. Per *Physics World*, "The idea is to surround a building with a lattice of holes or solid objects within the soil. When seismic waves within a certain range of wavelengths pass through the lattice, multiple reflections in the lattice interfere with one another destructively to create a band gap that results in a significant reduction in the shaking of the building."

Scientists described two such schemes for large-scale seismic control inspired by metamaterials at a recent meeting of the Seismological Society of America. One possibility is to design a surrounding landscape so that excavated holes and hills form a periodic array of barriers in areas prone to earthquakes. (Strategically placed rows of trees in a forest could also have a dampening effect.) Computer models indicate that this would be a better strategy for reducing ground motion than carving out deep, narrow canyons and hills. A second study used 3D simulations to demonstrate how designing buildings with varying heights and widths—and integrating that design with the surrounding mountains and valleys—could create a city-wide periodic structure similar to that of a metamaterial. In principle, such structures serve as resonators, removing energy from the shallow surface waves.

Co-author Stephane Brûlé, a civil engineer at a Lyon-based company called Menard, demonstrated the possibility of this kind of large-scale acoustic and seismic cloaking a few years ago with colleagues from the Fresnel Institute in Marseille. The researchers drilled a periodic array of boreholes into topsoil and discovered that sound waves reflected most of their energy back toward the source when they encountered the first two rows of holes. Brûlé noticed a similar foundational structure while on holiday in Autun (a town in central France), thanks to an aerial photograph of the semicircular structure of a Gallo-Roman theater buried under a field.

When Brûlé superimposed a more detailed archaeological photograph of the theater's structure over an image of one of the invisibility cloaking metamaterials he and his Fresnel colleagues had made in the lab, the ancient theater's pillars lined up almost perfectly with the microscopic elements in the metamaterial. He discovered similar overlap with images of the foundational structure of the Roman Colosseum and other, fully enclosed amphitheatres from the same era.

"I doubt that the [Romans] intentionally designed their buildings to be earthquake resistant."

Roman engineers may not have done this deliberately; they could have just been lucky, according to Brûlé. Or they might have noticed over the centuries that certain structures were more resistant to earthquake damage than others and modified their designs accordingly.

"Rigorously, we cannot say more for the moment," he told *Physics World*.

"The introduction of archaeological metamaterials is a fascinating idea," said Greg Gbur, a physicist at the University of North Carolina in Charlotte. "I doubt that the builders of structures in that era intentionally designed their buildings to be earthquake resistant, or even that they were able to unconsciously evolve their designs over time to make them

more secure—the time scales seem too short. I could imagine, however, that there might be a sort of 'natural selection' that occurred, where megastructures built with inadvertent earthquake cloaking might have survived longer than their counterparts, allowing us to see their remains now."

"There have been a few articles written in the past about the possibility of designing 'seismic cloaks' to protect buildings, but these were all focused on placing subsurface elements around an individual building to guide the waves," said Gbur. "This review illustrates how a well-designed urban area, consisting of multiple buildings, could use the buildings themselves as the elements of the cloak, using them to shield the most important or vulnerable buildings (schools, hospitals) from harm. I had my doubts about the feasibility of really designing practical seismic invisibility cloaks when the research first started coming out, but once again researchers have proven themselves more clever than I could imagine."

**Please visit the site: <https://arstechnica.com/science/2019/05/study-says-ancient-romans-may-have-built-invisibility-cloaks-into-structures/>**

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## **ARCHITECTURAL WONDERS BY EARLY CYCLADIC SOCIETY UNEARTHED ON GREEK ISLAND OF KEROS**

Four-year excavations and research on the extraordinary architectural findings of Kavos on the island of Keros in the Cycladic Islands group confirmed the existence in Early Cycladic times of a complex, stratified and technically expert society, according to ANA.

The sanctuary at Kavos on the islet of Keros was a significant regional centre for all the Cycladic Islands, Greece's Ministry of Culture said at the conclusion of the research programme under Cambridge University.

The programme has "revealed impressive architectural remains of a significant Early Cycladic settlement," the ministry noted.

Under the project, excavations were carried out on the small islet of Daskalio, originally connected to the nearby site of Kavos on Keros through a narrow strip of land. The date of Early Cycladic was confirmed scientifically, and the remains of the culture at the time include "impressive staircases, drainage pipes and stone buildings that reveal an advanced urban architecture without precedence for the specific period."

This year's results, the ministry pointed out, include paths leading to the top of the settlement, passing by terraces created to support buildings. "The complicated, interlinked and multi-level architecture shows the existence of a well-organised and well-built settlement on a steep promontory," it added.

The Daskalio buildings were mostly made of good-quality marble from Naxos island, almost 10 km north of Keros.

According to co-excavator professor Colin Renfrew, Daskalio indicates that the building techniques that were applied, the existence of huge entrance gates, stone ladders and the drainage pipes throughout the island show that there must have been a specialist architect and a central administration to carry out the building programme. He said the complexity of the construction is only comparable to Knossos on Crete for the same early period, he said.

The ministry added that materials discovered, including the marble and obsidian, show that the settlers were expert seamen and trade extended over a wide network reaching beyond the Cyclades.

Co-director of the site Michael Boyd added that a unique feature of the site includes the fact that metallurgy played a critical role throughout the life of the settlement. Its extent and scale proves a constant replenishing of raw materials from western Cyclades and Attica, and a social structure that trained and passed skills on to newer generations.

The fourth and last excavation period in the "Keros-Naxos Sea Roads" project took place in September and October 2018 by Cambridge University under the aegis of the British

School at Athens and the supervision of the Antiquities Ephorate of the Cyclades, represented by Irene Legaki. The four-year project picked up from where the former excavation cycle ended in 2008 at Kavos Daskaliou.

Please visit the site: <https://www.tornosnews.gr/en/greek-news/culture/35371-architectural-wonders-by-early-cycladic-society-unearthed-on-greek-island-of-keros.html> [Go there for pix]

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## **GREECE OPENS SHIPWRECK SITES TO DIVERS AS UNDERWATER MUSEUMS, BY ELENA BECATOROS**

Near the northern Greek island of Alonissos lies a remarkable ancient shipwreck: the remains of a massive cargo ship that changed archaeologists' understanding of shipbuilding in antiquity.

Now this spectacular find is to become the first ancient shipwreck to be made accessible to the public in Greece, including to recreational divers.

Greece's rich underwater heritage has long been hidden from view, off-limits to all but a select few, mainly archaeologists. Scuba diving was banned throughout the country except in a few specific locations until 2005, for fear that divers might loot the countless antiquities that still lie scattered on the country's seabed.

Ancient shipwrecks and even many more recent ones are still off-limits.

Now that seems to be gradually changing, with a new project to create underwater museums.

Divers will be able to tour certain shipwrecks and non-divers will experience the sites through virtual reality in information centers on land.

The first of these sites is the Peristera shipwreck, named for the uninhabited Greek island opposite Alonissos where it was discovered in the early 1990s. The cargo ship was laden with thousands of amphoras, or vases, probably containing wine, when it sank in the late 5th century B.C.

All that survives is the cargo, the exposed parts of the wooden ship having long since rotted away. But the sight is spectacular.

Thousands of ancient vases, the vast majority intact, lie in layers.

Fish, sponges and other sea creatures have made the amphoras their home, adding color and life to the site. In some places, the cargo towers above divers as they pass along the perimeter of the wreck.

"It is very impressive. Even I, who have been working for years in underwater archaeology, the first time I dived on this wreck I was truly impressed," said Dimitris Kourkoumelis, the lead archaeologist on the project preparing the site for visitors. "It's different to see amphoras ... individually in a museum and different to see them in such concentration."

The wreck still holds mysteries. Only a small part has been excavated, and experts have yet to determine how or why it sank, or what other treasures it might have carried beneath the estimated 4,000 amphoras in its hold.

There are indications a fire had broken out on board, but it's unclear whether that contributed to its sinking.

“Was it a piracy act? Was it overloaded?” said Elpida Hadjidaki, the first archaeologist to excavate the site. These questions remain unanswered.

The Peristera wreck is the largest ship of its time to have been found and its discovery was of major significance to historians.

“Up to then, we thought that large ships that were carrying 1,500 amphoras and were up to 70 tons, they were built by the Romans in the 1st century B.C.,” Hadjidaki explained. “Well, now we have a ship that was not built in the 1st century B.C., it was built in the 5th century B.C., it carried 4,000 amphoras and God knows what else and it's 126 tons.”

Hadjidaki said she is thrilled the wreck is being opened to visitors.

“It's fantastic. Twenty-five years ago, I was the first person that proposed that and people were jumping at me, they thought I was crazy,” she said. “Why should we keep it to ourselves? We have to give knowledge to people.”

The first test for guided tours of the wreck, which lies at a depth of about 22-28 meters (72-92 feet), was carried out last weekend with small groups of recreational and professional divers.

A thorough briefing, complete with historical information and the rules of the dive, preceded the short boat ride from the tiny harbor of Steni Valla on Alonissos to the site. On the wreck itself, explanatory signs have been suspended along the perimeter.

The initial feedback has been positive.

“It was an amazing opportunity ... to dive at last on an ancient wreck,” said Kostas Menemenoglou, a 39-year-old recreational diver from the central town of Volos. “It was a fantastic experience. It's really like diving into history.”

Three other shipwrecks in the Pagasitic Gulf in central Greece are also included in the project, which is part of a European Commission-funded BlueMed program, which plans to expand the project to Italy and Croatia. More test dives will be held this summer and next year, with hopes of fully opening the sites to recreational diving in early 2021.

“Accessible archaeological sites are one of the most interesting projects — not just a Greek project but a worldwide project,” said Kourkoumelis, who noted it has taken a long time to get to the point of allowing visitors to access an ancient wreck.

“It took years. And that's logical, because underwater ancient sites and particularly ancient shipwrecks are exposed ... and fragile,” he said, noting it was crucial to properly set up the project and the dive conditions, making sure the sites are protected before they can be opened to the public.

“All the conditions must be ensured so that these sites remain safe in the future and for future generations,” he added.

Please visit the site: <https://www.apnews.com/7d22b1ca09674593b7ec409820a2737d>  
[Go there for pix and caps]

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## **NEOLITHIC ROYAL INSCRIPTIONS** **DISCOVERED IN ASWAN,** **BY NEVINE EL-AREF**

An archaeological mission from Egypt's Ministry of Antiquities, which operates in Wadi Abu Subeira, has excavated early royal inscriptions in the Eastern Desert northeast of Aswan. The inscriptions date back to the Neolithic period.

Secretary-General of the Supreme Council of Antiquities Moustafa Waziri said that thousands of stone inscriptions from the Neolithic period were uncovered in a semi-enclosed circular valley, depicting scenes featuring animals that were living in the area at that time, such as giraffes, elephants and crocodiles.

Other inscriptions showing a small city, with scenes of cattle grazing and trees being planted, bear Egyptian royal signs, such as the falcon god Horus.

Abdel-Moneim Saeed, director-general of Aswan and Nubian Antiquities, said that sacred motives were also found on some blocks such as the sacred sign of Horus as well as other foliage decorations.

**Please visit the site:**

**<http://english.ahram.org.eg/NewsContent/9/40/331279/Heritage/Ancient-Egypt/Neolithic-royal-inscriptions-discovered-in-Aswan-.aspx> [Go there for pix]**

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## **A FRESH PERSPECTIVE ON A CLASH OF ANCIENT EMPIRES - EVIDENCE OF ANCIENT LEAD–SILVER MINING POINTS TO THE EXTRAORDINARY RESOURCEFULNESS OF CARTHAGE DURING THE PUNIC WARS FOUGHT FROM 264 TO 146 BCE, BY RIEKO KAWABATA**

Researchers exploring traces of Carthaginian civilization from more than 2,500 years ago have uncovered the first evidence of metal ore mining in North Africa. Their findings suggest that the Carthaginians were much more resourceful and adaptable than previously assumed.

In its heyday, Carthage — founded by the Phoenicians in the 9th century BCE in present-day Tunisia — was a powerful empire that extended throughout North Africa and the western Mediterranean. Its strategic position as the dominant port for trade made it a target for repeated attacks by the Romans.

The new evidence sheds fresh light on the story of how Carthage was able to finance its long and costly wars before its ultimate fall to Rome in 146 BCE.

By measuring lead isotope compositions of sediments taken from deep below the Medjerda delta around the city of Utica, to the north of Carthage in Tunisia, the team established a timeline for mining activity related to the minting of Punic coins that were crucial to ancient commerce.

“The earliest mining began, not at the time Utica was founded, but much later during the Greco-Punic Wars (480–307 BCE),” says corresponding author Hugo Delile of the University of Lyon. This rules out the idea that mineral resources were the motivating factor behind the original Phoenician settlement in Utica and Carthage. “It is interesting that this initial phase of mining coincided with the first minting of coins at Carthage,” he says. “From then onwards, the Carthaginian economy became increasingly monetized.”

The team found that the most intense mining phase took place during the Punic Wars. This discovery strengthens the view that the Carthaginians, despite losing access to traditional silver sources in Sardinia, Sicily and southern Spain, were still able to exploit resources closer to home.

“This adaptive strategy is indicative of the Carthaginians’ strong economic resilience, built on a sound knowledge of their mineral resources,” Delile says. “The strategy was fruitful because it allowed them to fight off the Romans for more than a century.”

The increase in coin production during the Punic Wars was driven by a strong military need, as Carthage was under pressure not only to reinforce its armies but also to pay war indemnities to Rome.

It is nevertheless surprising, Delile points out, to see such high levels of mining activity during periods of geopolitical unrest.

Generally, the opposite is the case; the Romans are famous for their intense urban activity during periods of prosperity and stability. The Carthaginians appear to be an exception to this classic model.

Sheldon Skaggs, a specialist in geoarchaeology at City University of New York, who was not involved in the study, says the findings add “great support to the idea that silver and lead were mined in North Africa in significant quantities during Punic times.”

“The geologic evidence fills gaps that the historical documents don’t cover,” he says. “This is significant new information, and highlights a useful method for looking at mineral production in other regions along the southern and eastern Mediterranean.”

Delile and the team intend to continue documenting ancient human activities, which are important, he says, for gaining “a long-term reading of the Anthropocene.”

doi:10.1038/nmiddleeast.2019.67

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Delile, H. et al. Economic resilience of Carthage during the Punic Wars: Insights from sediments of the Medjerda delta around Utica (Tunisia). PNAS <http://dx.doi.org/10.1073/pnas.1821015116> (2019).

**Please visit the site:**

<https://www.natureasia.com/en/nmiddleeast/article/10.1038/nmiddleeast.2019.67>

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## **ARCHAEOLOGISTS FIND SECRET CHAMBER DECORATED WITH CENTAURS AND A SPHINX INSIDE NERO'S PALACE IN ROME, BY NICK SQUIRES**

Archeologists have chanced upon an underground chamber decorated with images of panthers, centaurs and a sphinx in the remains of a vast palace built by the Emperor Nero in Rome.

The room, which was part of the huge Domus Aurea palace built by the emperor in the first century AD, had remained hidden for nearly 2,000 years.

It was discovered by accident during restoration of an adjacent area of the palatial complex, which was built on by subsequent emperors, including Trajan, and now lies interred beneath a hill next to the Colosseum in the historic heart of Rome.

The colours of the frescoes, which depict mythical water creatures as well as a crouching sphinx, a panther leaping at a man armed with a sword, the god Pan and a centaur, are remarkably bright given their age.

The chamber has been dubbed by archeologists the Sphinx Room. The discovery was of “immense artistic and archeological value,” said Alfonsina Russo, the director of the Colosseum archeological park, which includes the Domus Aurea.

The images were probably painted by imperial Roman craftsmen between 65AD and 68AD, said Alessandro D’Alessio, the official in charge of the Domus Aurea, or Golden Palace.

Much of the 15ft-high chamber is still filled with dirt, which will be excavated in the next few months. That could bring to light further discoveries.

“We hope to finish the work by the end of the year,” said Prof Russo.  
“The room is well preserved but it needs cleaning and restoration.”

The palace was built by Nero after the great fire of AD64, which devastated Rome. He is famously said to have fiddled, or played a lyre, while the city burned – a story that historians dismiss as fable.

Nero’s palace was so large, with its courtyards and landscaped gardens, that it covered three of Rome’s seven hills.

It even featured a revolving dining room, according to the historian Suetonius. “There was a circular banquet hall, which revolved incessantly, day and night, like the heavens,” he wrote.

But after Nero’s death, much of the palace was obliterated by his successors.

The Colosseum, where gladiators fought each other and wild animals, was built on the site of a vast ornamental lake that Nero had created.

The Emperor Trajan built baths on top of part of the complex.

**Please visit the site: <https://www.telegraph.co.uk/news/2019/05/09/archeologists-find-secret-chamber-decorated-centaurs-sphinx/> [Go there for pix]**

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## **BRENT SEALES AWARDED PRESTIGIOUS MELLON GRANT, POISED TO SOLVE 2,000- YEAR-OLD MYSTERY, BY LINDSEY PIERCY**

Dubbed "the man who can read the unreadable," the story of Brent Seales is one of patience and perseverance. With the computer science professor at the helm of the Digital Restoration Initiative, the University of Kentucky is poised to become a world-class leader in "unwrapping" cultural artifacts.

For more than two decades, Seales and his dedicated team — of staff and student researchers — have doggedly labored to do the impossible. With renowned expertise, they've non-invasively recovered fragile texts, such as Homer's "Iliad" and the Dead Sea Scrolls.

Yet, there is one mystery the team still longs to solve — revealing the elusive texts within the carbonized Herculaneum scrolls.

These papyri are among the most iconic — and inaccessible — of the world's vast collection of damaged manuscripts. Buried and burned in the eruption of Mount Vesuvius in 79 CE, the scrolls offer a unique window to the ancient world. Unfortunately, they are too fragile to unroll.

Now, after a 10-year lull, Seales has found a way forward.

### **Mellon Grant Advances Digital Restoration Initiative**

Thanks, in large part, to a \$2 million grant from The Andrew W. Mellon Foundation, Seales finally has the materials access, funding support and technical approach needed to solve the 2,000-year-old mystery.

The prestigious Mellon grant will provide the resources the team needs to virtually unwrap and digitally restore the scrolls. It will also support the electronic compilation and dissemination of the entire Herculaneum collection, which is currently spread across four different institutions: the Bodleian Library at Oxford University, the British Library, the Institut de France and the Biblioteca Nazionale di Napoli.

Using cutting-edge technology, Seales is embarking on a daunting task. No other researcher has managed to create a comprehensive catalog of Herculaneum papyri.

"No one can cast blame at past researchers, because no other time in history has afforded us the technological advances and collaborative spirit that exists now," he explained. "Plus, there is a renewed interest in the classics. We have this realization that people may not always appreciate the great writings, literature and philosophy of the past. All of these issues make now the perfect time."

### **From Invisibility to Readability**

This June, Seales will get the opportunity to oversee his first scans of Herculaneum scrolls in nearly a decade.

Several items from Naples, Italy, will be part of “Buried by Vesuvius: Treasures from the Villa dei Papiri,” an exhibit about Herculaneum at the Getty Villa in Los Angeles, California. Prior to going on display, the scrolls will be scanned in an imaging lab at the University of California, Los Angeles (UCLA). The scans will be instrumental in the final development of a specialized machine learning tool designed to reveal Herculaneum text.

In 2016, Seales' team developed the Volume Cartographer, a revolutionary computer program for locating and mapping 2D surfaces within a 3D object. The software pipeline is used with micro-CT to generate extremely high-resolution images — enabling the ability to read a document without ever needing to physically open it. The charred scroll from En Gedi was the first complete text to be revealed using the software.

"There have been a couple of cases where I've been the first human being to look at some characters that another human wrote down 2,000 years ago," Stephen Parsons, a staff researcher on the En Gedi project, said.

While the first-of-its kind software has profoundly impacted history and literature, not all damaged artifacts are created equal.

The Herculaneum scrolls pose a unique challenge.

Because it works with X-rays, the Volume Cartographer software relies on the presence of metals in ink to help distinguish the writing from the surface on which it sits. But Herculaneum ink is different from that used to pen ancient Hebrew and medieval documents. It's made of carbon, which is invisible to the human eye in micro-CT images.

To address this problem, the team has developed a neural network that "learns" how patterns in the data look when ink is present, as opposed to how patterns appear when no ink is present. A machine learning algorithm is trained to detect and recognize the unique data signatures. The teams' ground-breaking work in this area was recently featured in a PLOS ONE article.

"There are similar problems in medicine that people are handling with medical CT scans, particularly of brain neurons," Parsons explained.

"We're kind of right on the cusp, and it's my job now to help us get over the hump. That is challenging, of course, but it's pretty exciting."

The next step will be to apply the tool to the UCLA scans in hopes of reading the text wrapped inside the scrolls.

### **Students Remain Key in Unlocking Sealed Secrets**

Over the years, Seales has been as committed to developing students' talents as he has to revealing hidden words. He is currently leading a research team of six undergrads in Paris, France. They will spend a week surveying and studying Herculaneum materials at

the Institut de France in preparation for scanning, which will take place next September at Diamond Light Source, a high-energy physics facility in Oxford, England.

By engaging in hands-on research, students are able to determine an area of interest and jump start their careers. "It's really fascinating to me to see these documents that people can't do much with," Kristina Gessel, a computer science student, said. "I'm still considering possibly going for a Ph.D., because this research is fascinating to me. What I've seen here is just absolutely awesome."

In addition to personal and professional benefits, an increased commitment to undergraduate research will enhance the prospects for U.S. leadership in computer science.

"It's just amazing that the work we are doing is putting Kentucky on the map," Kyra Seevers, a computer science student, added.

### **The Promise Moving Forward**

Seales is considered the foremost expert in the digital restoration of cultural antiquities. To this day, his quest to uncover ancient Western wisdom is ever evolving.

And though, at times, progress is slow and breakthroughs seem distant — Seales always remains steadfastly optimistic. He's confident that it's only a matter of time before the Herculaneum papyri succumb to modern technology and, more importantly, to his team's determination.

"We plan to keep showing the world what can be done, right here at UK," he said. "With the boost from prestigious organizations like the NEH and The Andrew W. Mellon Foundation covering our immediate research needs, our next step is to grow the Digital Restoration Initiative into a world-class imaging and restoration lab. Overcoming damage incurred during a 2,000-year span is no small challenge. But that's what we do in Kentucky — conquer the seemingly impossible."

For more about Seales' fascinating work, tune into a recent edition of "Behind the Blue," with UK Public Relations and Strategic Communications' Carl Nathe.

More information about the Digital Restoration Initiative can also be found online.

**Please visit the site: <http://uknow.uky.edu/research/brent-seales-awarded-prestigious-mellon-grant-poised-solve-2000-year-old-mystery> [Go there for testimonial video]**

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## **GENETIC STUDIES OF THE INHABITANTS OF ONE OF THE WORLD'S OLDEST CITIES - CATALHÖYÜK**

The social structure of the inhabitants of one of the oldest cities in the world, Çatalhöyük in Turkey, was more complex than scientists assumed. Kinship could have a secondary role in it, scientists determined on the basis of DNA tests of the deceased.

Çatalhöyük, an archaeological site in central Turkey, was inhabited for almost 1200 years between 7100 and 5950 BC. It is estimated that in the period of the greatest prosperity, the densely built settlement with an area of several dozen hectares had approx. 6 thousand residents. An interesting fact is that the dead were buried under the floors of houses.

An international team of geneticists (which includes researchers from Ankara and Stockholm) coordinated by Maciej Chyleński from the Fossil DNA Laboratory at the Adam Mickiewicz University in Poznań decided to study the DNA of some of the human remains discovered in the prehistoric settlement. Researchers focused on the remains of nearly 40 people found under the floors of 4 houses inhabited by approx. 8.5 thousand years ago. In an interview with PAP, Chyleński emphasises that the genetic material is poorly preserved, which is why its examination is not an easy task.

"For now, we know that the dead buried under the same house were not related in the maternal line. For example, in the case of children found under the floors, the women buried next to them were not their mothers. We do not know if they were related in any other way" - Chyleński says. He adds that further analysis of data from nuclear genomes is necessary to completely rule out kinship, but these genomes are poorly preserved. The geneticist will make further attempts to obtain nuclear genomes in the near future.

"However, the mitochondrial genomes (the information they contain is inherited only in the female line - PAP), in combination with the results obtained by anthropologists working at the site, suggest that the social structure of Çatalhöyük was more complex than one would expect and biological kinship it could have a secondary role in it" - the scientist says.

Thus, as a result of the genome analysis, numerous previous archaeological speculations have been disproved - the inhabitants of one house probably did not belong to one family.

Geneticists also found that in genetic terms, the inhabitants of the prehistoric city were genetically closely related to the peoples of the Sea of Marmara. This area played an important role in the spread of agriculture and animal breeding in Europe, called the Neolithic Revolution.

"The time of the beginning of the Neolithic in both regions and similarities in material culture may indicate that populations from Central Anatolia, or groups closely related to

them, participated in the Neolithic Revolution in the Marmara Sea region" - Chyleński says.

The results of the study were published in the journal Genes. The project was financed with a grant obtained from the National Science Centre.

Çatalhöyük is one of the most famous archaeological sites in the world. It became famous due to the characteristic buildings consisting of houses built of mud brick. Their walls adhered directly to each other, and the entries were at the roof level. The interiors of some of the houses were richly decorated with paintings, among other things. In 2012, it was inscribed as a UNESCO World Heritage Site.

**Please visit the site:**

<http://scienceinpoland.pap.pl/en/news/news%2C77047%2Cgenetic-studies-inhabitants-one-worlds-oldest-cities-catalhoyuk.html>

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## **BAALBEK: WERE THE MEGALITHS PUT IN PLACE UNDER HEROD?**

One of the most complex architectural feats ever conceived on planet Earth is the magnificent temple of Jupiter at Baalbek, Lebanon. The Temple is worldwide famous for its size and megalithic architecture, but a impressive number of problems remain unsolved about this monument, including precise dating of the phases of construction. The Romans indeed certainly built the final phase, boosting huge 20 mts high columns, around 60 AD, but who started the construction?

The building indeed consists of a huge basement surrounded by a even huger wall. The design of this wall is astonishing: it was conceived as the superposition of increasingly greater stones as the height increases. Enormous megaliths (about 500 tons each) were raised to sustain the upper course, made of simply unbelievable blocks (around 4x4x20 m, 1000 tons). Other, enormous blocks remain in the quarry a few hundreds of meters to the southwest.

A few years ago, it was proposed by Andreas J. M. Kropp and Daniel Lohmann that the internal basement was first conceived and partly built by Herod the Great around 15 BC. The area was not under Herod's direct control, but he was a friend of the Romans who funded the colony of Berytus (Beirut) exactly in those years. These authors, however, did not attempt to date the megalithic phase to Herodian architects. This has been recently done by Giulio Magli in a work published in the scientific volume *Archaeoastronomy in the Roman World*.

In the paper, Magli gives several arguments taken from different disciplines - including Archaeoastronomy. The temple is indeed shown to be oriented to the rising of the Pleiades, a group of stars connected with fertility and renewal in the Greek-Hellenistic world but a uncommon choice of orientation for a Roman architect. Further, clear architectural analogies exist with the Herodian foundations of the Temple Mount in Jerusalem, visible in the so called western tunnel and made of gigantic stone blocks very similar to those of the intermediate course in Baalbeck.

Herod the Great is a quite controversial figure of history. However, his fame as a great builder is undisputed, and it really seems that we can add a further masterpiece - besides the Temple Mount, Masada, and the Herodium - to the list of his architectural achievements.

Please visit the site: [https://www.eurekaalert.org/pub\\_releases/2019-05/pdm-bwt052219.php](https://www.eurekaalert.org/pub_releases/2019-05/pdm-bwt052219.php)

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## **DNA FROM MUMMY'S TOMB REVEALS ANCIENT EGYPTIAN ORIGINS OF WATERMELON, BY MICHAEL LE PAGE**

We've been enjoying watermelons for thousands of years

Did ancient Egyptian children compete to see who could spit seeds the furthest as they ate watermelons? It seems likely, because thanks to some DNA detective work we now know for sure that the ancient Egyptians ate domesticated watermelons with sweet, red flesh.

The wild watermelons found in parts of Africa are nothing like the domesticated varieties. They are small, round and have white flesh with a very bitter taste due to compounds called cucurbitacins.

There's long been debate about when and where they were domesticated, with some suggesting it took place in south Africa or west Africa.

However, pictures on the walls of at least three ancient Egyptian tombs depict what look like watermelons – including one that looks strikingly like modern varieties (pictured below). And in the 19th century, watermelon leaves were found placed on a mummy in a tomb dating back around 3500 years.

When botanist Susanne Renner at the University of Munich, Germany, learned about these leaves, she realised their DNA might reveal what the ancient melons were like. She also discovered that some of the leaves had been sent to the famed botanist Joseph Hooker, then head of Kew Gardens in London. "It was my love of the old literature," she says.

Mark Nesbitt at Kew gave Renner's team a tiny sample of one leaf. He had trouble opening the display case containing the leaves, she says, as it had not been opened since the leaves were first placed in it in 1876.

The ancient DNA was then sequenced by Renner's colleague Guillaume Chomicki, now at the University of Oxford. The team were only able to get a partial genome sequence, but it includes two crucial genes that reveal what these melons were like. "We were so lucky," says Renner.

One of these genes controls the production of the bitter cucurbitacins. In the 3500-year-old melon, there was a mutation that disabled this gene, meaning it had sweet flesh just like modern varieties.

The other gene codes for an enzyme that converts the red pigment lycopene – the same pigment that makes tomatoes red – into another substance. This gene was also disabled by a mutation, meaning lycopene accumulates and the fruit would have red flesh.

What the team can't tell from the partial sequence is how large the melons were and whether they had an elongated shape or round shape.

But one of the ancient Egyptian pictures shows what appears to be an elongated melon, so it seems farmers had bred watermelons with most if not all of the key features at least 3500 years ago.

The DNA also reveals that the ancient melon was closely related to a sweet watermelon with white flesh still grown in the Darfur region of Sudan. That suggests the watermelon was first grown by farmers in this region and the use of the plant then spread northwards along the Nile, with further improvements like red flesh occurring along the way.

Please visit the site: <https://www.newscientist.com/article/2204095-dna-from-mummys-tomb-reveals-ancient-egyptian-origins-of-watermelon> [Go there for pix]

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## **KING TUT WORE ANCIENT, METEOR- BLASTED YELLOW GLASS, BY YASEMIN SAPLAKOGLU**

About 29 million years ago, the sands of the western Egyptian desert melted and created tiny pieces of canary yellow glass — some of which ended up decorating King Tut's pectoral (chest ornament).

This natural glass, found across thousands of square kilometers in western Egypt, is thought to have originated from one of two events: either a meteorite impact on the surface of Earth or an airburst, an explosion that happens when a space rock enters our planet's atmosphere. [Photos: Giant Spiral Grows Out of Egypt's Desert]

A new study suggests it's the former. The glass once contained pieces of a rare "shocked" mineral called reidite, which forms only during a meteorite impact, researchers from Australia and Austria reported May 2 in the journal *Geology*.

The heat created by either the meteorite impacts or an airburst would have been enough to liquefy the sand in the desert, creating the glass particles. But while airbursts create shock waves up in the air that can be thousands of pascals (a unit of pressure), asteroid impacts cause shock waves of billions of pascals on the ground, the researchers wrote. (In other words, meteorite impacts create shock waves that have millions of times more pressure than those created by airbursts.)

In the new study, the researchers analyzed grains of the mineral zircon found in the glass; the scientists discovered that it contained evidence of the former presence of reidite.

In other words, its constituents are oriented in a way that indicates a once-present reidite transformed, at one point, to zircon. This provides the first "unequivocal" evidence that the glass was created by high-pressure shock waves, and thus from a meteorite impact, the researchers wrote in the study.

"Meteorite impacts are catastrophic events, but they are not common," co-author Aaron Cavosie, a senior research fellow at Curtin University in Australia, said in a statement. "Airbursts happen more frequently, but we now know not to expect a Libyan-desert glass-forming event in the near future, which is cause for some comfort."

Please visit the site: <https://www.livescience.com/65503-glass-egypt-desert-meteorite-impact.html> [Go there for pix]

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## **ANCIENT ROMANS USED MOLTEN IRON TO REPAIR STREETS BEFORE VESUVIUS ERUPTED, BY OWEN JARUS**

Ancient workers used molten iron to repair Pompeii's streets before the historic and devastating eruption of Mount Vesuvius in A.D. 79, a team of archaeologists has discovered.

The discovery reveals a previously unknown method of ancient Roman street repair and represents "the first large-scale attestation of the Roman use of molten iron," wrote researchers Eric Poehler, a classics professor at the University of Massachusetts Amherst; Juliana van Roggen, an independent researcher; and Benjamin Crowther, a doctoral student at the University of Texas at Austin, in a paper recently published in the American Journal of Archaeology.

When Mount Vesuvius erupted, it covered the city in ash and lava; though the eruption killed many of Pompeii's inhabitants, it also preserved the city in time. [Pompeii Photos: Archaeologists Find Skeletal Remains of Victims of Vesuvius Eruption]

### **Iron streets**

Many of Pompeii's streets were paved with stone, but during a survey in July 2014, archaeologists found that over time, the passage of carts eroded those stones to form deep holes, or ruts. Repaving streets was an expensive and time-consuming process, historical records and archaeological remains show.

"One option for repair, complete repaving in stone, was a difficult and expensive endeavor that might block important through-routes in a city for months," the researchers wrote in their paper.

This posed a problem for the people of Pompeii, since some of the city's many streets could become eroded quickly. "Investigations at Pompeii have shown that particularly high volumes of traffic concentrated in narrow streets could wear down even a stone-paved surface in only a few decades," the researchers wrote.

The team found that "the Pompeians devised another option [for street repair] that was ingenious and unconventional: after heating iron or iron-rich slag to a molten state, they poured out hundreds of individual repairs onto, into and below the paving stones of the city's most important streets," the researchers wrote.

After the molten iron was poured, it filled the holes and hardened as it cooled down. In addition to iron, other materials such as stone, ground-up pieces of terracotta and ceramics were also inserted into the holes to help fill them up. This method of repair was cheaper and faster than repaving a street, researchers found.

### **Molten method mystery**

"How the Romans introduced liquefied iron material into the streets at Pompeii remains a mystery," the researchers wrote.

The Romans would have needed to heat up iron or iron slag to between 2,012 and 2,912 degrees Fahrenheit (1,100 to 1,600 degrees Celsius), depending on the type of iron being melted, the researchers wrote, noting that reconstructed Roman furnaces can reach these temperatures.

Researchers found numerous examples of iron drops on sections of streets that didn't require repair, which suggests that molten iron was sometimes accidentally spilled while being carried onto Pompeii's streets.

It's likely that slaves carried the molten iron through Pompeii, Poehler said in an email, noting that Roman cities had public slaves, and magistrates (senior officials who held power in Roman cities) could have used their own slaves to perform tasks like street repair.

Next, the researchers hope to analyze the chemistry of the iron to figure out where it was mined. There are also more streets in Pompeii to survey, they said.

**Please visit the site: <https://www.livescience.com/65479-ancient-romans-used-molten-iron-street-repair.html>**

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## **INHABITANTS OF NEOLITHIC ÇATALHÖYÜK SUFFERED FROM INTESTINAL PARASITES**

An international team of archaeologists has found 8,000-year-old eggs of the [whipworm \(\*Trichuris trichiura\*\)](#) in coprolites (fossilized feces) from Çatalhöyük, a prehistoric settlement inhabited from about 7100 to 5600 BCE — the earliest archaeological evidence for intestinal parasite infection in the mainland Near East.

Çatalhöyük is one of the largest and best preserved Neolithic sites in the world. It is located southeast of the modern Turkish city of Konya, about 90 miles (145 km) from Mount Hasan.

The population of Çatalhöyük were early farmers, growing crops such as wheat and barley, and herding sheep and goats.

The toilet was first invented in the 4th millennium BCE in Mesopotamia, 3,000 years later than when Çatalhöyük flourished.

It is thought the people living at Çatalhöyük either went to the rubbish tip (midden) to open their bowels, or carried their feces from their houses to the midden in a vessel or basket to dispose of them.

“We would expect this to have put the population at risk of diseases spread by contact with human feces, and explains why they were vulnerable to contracting whipworm,” said Dr. Marissa Ledger, a researcher in the Department of Archaeology at the University of Cambridge.

“As writing was only invented 3,000 years after the time of Çatalhöyük, the people were unable to record what happened to them during their lives. This research enables us for the first time to imagine the symptoms felt by some of the prehistoric people living at Çatalhöyük who were infected by this parasite.”

To look for the eggs of intestinal parasites, Dr. Ledger and colleagues used microscopy to study the coprolites from Çatalhöyük. The samples dated from 7,100-6150 BCE.

To determine whether the coprolites excavated from the midden were from human or animal feces, they were analyzed for sterols and bile acids. This analysis demonstrated that the coprolites were of human origin.

Further microscopic analysis showed that eggs of whipworm were present in two of the coprolites, demonstrating that people from the prehistoric village were infected by this intestinal parasite.

“It was a special moment to identify parasite eggs over 8,000 years old,” said Dr. Evilena Anastasiou, from the University of Cambridge.

“Now we need to find ancient fecal material from prehistoric hunter-gathers in the Near East, to help us understand how this change in lifestyle affected their diseases,” said Dr. Piers Mitchell, also from the University of Cambridge.

The [findings](#) were published today in the journal *Antiquity*.

Marissa L. Ledger *et al.* Parasite infection at the early farming community of Çatalhöyük. *Antiquity*, published online May 31, 2019; doi: 10.15184/aqy.2019.61

Please visit the site: [http://www.sci-news.com/archaeology/catalhoyuk-intestinal-parasites-07243.html?fbclid=IwAR3ilyhXoip4vWFrkIDo78noBs\\_6BIK7iItzvFcY\\_0bjjdDAkAdWrBZ11k#.XPFm-qAo1hw.facebook](http://www.sci-news.com/archaeology/catalhoyuk-intestinal-parasites-07243.html?fbclid=IwAR3ilyhXoip4vWFrkIDo78noBs_6BIK7iItzvFcY_0bjjdDAkAdWrBZ11k#.XPFm-qAo1hw.facebook)

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## **ARCHAEOLOGISTS MAY HAVE FOUND THE PLACE WHERE ROMAN EMPERORS WERE BAPTIZED, BY SARAH E. BOND**

Excavations conducted around the largest Christian cathedral built in the ancient Mediterranean have yielded new archaeological discoveries.

The latest book from Byzantine archaeologists Ken Dark and Jan Kosteneč, *Hagia Sophia in Context: An Archaeological Re-examination of the Cathedral of Byzantine Constantinople*, examines the new archaeological discoveries made within and around the largest Christian cathedral built in the ancient Mediterranean. In excavations conducted between 2004 and 2018, the Hagia Sophia project, led by Dark and Kosteneč, exposed a number of new structures that together radically alter our understanding of the topography, role, and use of the cathedral over 1400 years ago. It also demonstrates that the monumental structure has long been a political lightning rod used by emperors, sultans, and now presidents.

Long before Notre Dame caught fire a few weeks ago, fires were a looming threat for ancient cathedrals. One of the most famous structures to suffer fire's destructive power is Hagia Sophia (in the modern Greek, "Holy Wisdom"), a former cathedral and then mosque which now serves as a museum in Istanbul, in modern day Turkey. The building that stands today is actually the third version of the structure built on the sacred site; it was originally erected in the then-developing city of Constantinople. In 360 CE, the Roman emperor Constantius II built the first iteration of the church, simply called Megale Ekklesia ("Great Church"), which was then damaged by fire and rioting in 404 CE. It was rebuilt shortly thereafter by emperor Theodosius II in 415 and soon thereafter began to be referred to as Hagia Sophia, before being damaged again by the widespread rioting surrounding the Nika Revolts in 532 CE. Employing the famed architects Anthemios of Tralles and Isidoros of Miletos, the emperor Justinian immediately rebuilt Hagia Sophia in just 5 years and consecrated it in 537 CE as a physical testament to his piety and potency.

One of the biggest discoveries alleged by Dark and Kosteneč is the uncovering of the "Great Baptistery" just north of the church, which would have been used to baptize members of the imperial family from the 6th century CE onward. In the 10th century book *De ceremoniis*, which records the correct performance and topography of various rites, ceremonies, and processions, the author distinguishes between two baptisteries near Hagia Sophia: the Great Baptistery and the Small Baptistery. This study also enriches our knowledge of the architectural decoration of Hagia Sophia by uncovering marble that may have constituted a courtyard for the earlier Megale Ekklesia and recognizing a hitherto unknown porch to the cathedral. Excavators also uncovered an inlaid porphyry circle that may have been the exact spot where Justinian once stood during certain ceremonies. As it turns out, even Roman emperors needed to have a reminder for where they needed to stand.

The northeast vestibule, seen from the east. The blocked marble framed door and the greenstone pier are on the left and the porphyry disc in the floor is in the centre (image courtesy Oxbow Books).

Perhaps the largest contribution of the publication of these excavation findings is expanding our understanding of how the cathedral worked in tandem with the Patriarchate, the various buildings which housed the Patriarch, the head of the Eastern Orthodox Church. The recent excavations appear to have pinpointed the Patriarchal library and better defined the Large Hall and a surrounding building called the Thomaites, after an ecumenical patriarch of Constantinople named Thomas I (607-610 CE). The spatial and aesthetic connections between Hagia Sophia proper and the surrounding buildings of the Patriarchate demonstrate an interconnected network of ecclesiastical buildings that could function alternately for imperial ceremonies, synods, study, and worship.

The rectangular room on the upper level of the southwest buttress, showing two phases of its fresco decoration on the east wall and part of the north wall (seen from the southwest). The earlier fresco on the east wall imitates polychrome marble wall revetment, with a cross between two purple discs above the door opening into the cruciform chapel on the east side of the buttress. The later fresco shows figural decoration on the east wall and this continues on the north and west sides. There is a fragmentarily preserved underdrawing of the enthroned Christ, holding the Gospels and Blessing (and to whom saints approach from both sides) over the doorway in the east wall (image courtesy Oxbow Books). The rectangular room on the upper level of the south-west buttress. Figures of saint-bishops in the upper part of the west wall (Phase 3 of the fresco decoration of the west wall), seen from east (image courtesy Oxbow Books).

Hagia Sophia was in constant use until the sacking of the city in 1453 by the Ottoman Turks. It was then that Mehmed II and his troops captured Constantinople and began to promote Islam. Hagia Sophia became a mosque, but was then turned into a museum in 1935. Recently, Turkish President Recep Tayyip Erdogan has threatened to turn the site back into a mosque, though many have noted that this is a common election move meant to demonstrate his conservative values and rally his followers prior to an election. In March elections, Ekrem Imamoglu, of the opposition Republican People's Party (CHP), caused political tumult when he won the election to be Istanbul's mayor. His victory ended 25 years of domination by Erdogan's political party, the Justice and Development Party (AKP). Turkey's election board has now annulled the March election and scheduled a new election for June 23.

For the over 3 million visitors who travel to see Hagia Sophia every year, these elections may or may not have an impact on their experience within the great house of worship. What can at least be said is that the energetic and important work of archaeologists in and around the great structure over the past two decades have helped the rest of the world to better understand Justinian's vision for Hagia Sophia and how it functioned as the epicenter of ecclesiastical life centuries before. Understanding the monument's manipulation in the past may now help us to understand how it is being wielded in the present.

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Hagia Sophia in Context: An Archaeological Re-examination of the Cathedral of Byzantine Constantinople, was published this year by Oxbow Books.

Please visit the site: <https://hyperallergic.com/501520/great-baptistry-hagia-sophia-byzantine-archaeology> [Go there for pix]

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## **ISRAELI SCIENTISTS FIND EVIDENCE OF 'RECYCLING' 400,000 YEARS AGO**

“Recycling was a way of life for these people,” said Prof. Ran Barkai, one of the Israeli researchers.

A new Tel Aviv University study found that there is evidence that 400,000 years ago, prehistoric humans "recycled" their broken flint, the researchers announced on Wednesday. They transformed their discarded flint tools to make smaller utensils with specific functions.

“Recycling was a way of life for these people,” said Prof. Ran Barkai, one of the Israeli researchers. “It has long been a part of human evolution and culture. Now, for the first time, we are discovering the specific uses of the recycled ‘tool kit’ at Qesem Cave.”

The Qesem Cave is located outside of Tel Aviv and since its discovery in 2000, it has been used to discover countless insights into the life of those from thousands of years ago.

“We used microscopic and chemical analyses to discover that these small and sharp recycled tools were specifically produced to process animal resources like meat, hide, fat and bones,” postdoctoral fellow Dr. Flavia Venditti explained. “We also found evidence of plant and tuber processing, which demonstrated that they were also part of the hominids’ diet and subsistence strategies.”

“Our data shows that lithic recycling at Qesem Cave was not occasional and not provoked by the scarcity of flint,” Venditti concludes. “On the contrary, it was a conscious behavior which allowed early humans to quickly obtain tiny sharp tools to be used in tasks where precision and accuracy were essential.”

**Please visit the site: <https://www.jpost.com/Israel-News/Israeli-scientists-find-evidence-of-early-humans-recycling-590996> [Go there for pix]**

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