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# Πληροφοριακό Δελτίο της Ελληνικής Αρχαιομετρικής Εταιρείας

- Απρίλιος 2022 -

Most people, in fact, will not take the trouble in finding  
out the truth, but are much more inclined to accept the  
first story they hear.  
(Thucydides)

## Newsletter of the Hellenic Society of Archaeometry

- April 2022 -

**Nr. 253**

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## **ΣΥΝΕΔΡΙΑ - CONFERENCES/WORKSHOPS**

# **UNDERWATER PHOTOGRAMMETRY: METHODS AND CHALLENGES FOR MAPPING AND MONITORING, JUNE 5, 2022, XXIV ISPRS CONGRESS, NICE, FRANCE**

Dear friends and colleagues,

As part of the working group **WGII/9** activities of the **ISPRS** - International Society for Photogrammetry and Remote Sensing, we are organizing the **tutorial**:

**“Underwater photogrammetry: methods and challenges for mapping and monitoring”**

June 5, 2022 at the **XXIV ISPRS congress** in Nice, France.

The tutorial aims at providing the audience with an introduction to the crucial aspects of underwater photogrammetry, as key technique for studying and understanding the underwater world in many application fields, such as exploration and mapping, industry, metrology, archeology, biology, etc.

Specifically, the following topics will be covered:

- **Image formation underwater**: optical considerations
- Photographic aspects: light absorption, scattering, **depth dependent white balance** and **color correction**
- Flat vs Dome ports (from optical to geometric influences in underwater photogrammetry)
- **Underwater camera calibration** approaches: implicit vs explicit modelling
- Reference systems, **accuracy assessment** and method of controls with scale bars, **underwater geodetic measurements**, acoustic positioning systems, pressure and inertial sensors, laser based optical scaling
- **Platforms** for underwater photogrammetry, from surface vehicles to scuba divers to **ROVs** and **AUVs**
- Underwater **visual odometry** and **SLAM**
- Mono, stereo and multi camera systems
- **Two media bathymetric photogrammetry**
- Overview of applications: needs and approaches in **archeology**, **ecology**, **metrology** and **industry**.

The attendees will 'dive' into the addressed topics and practice with provided datasets, off-the-shelf software applications and in-house developed algorithms. Participants are also encouraged to bring their own datasets, showcase their applications and discuss issues faced in their practices.

Resources that will be distributed: all the teaching material (i.e. the PowerPoint presentations, image datasets, python codes).

Target audience: PhD students, researchers and practitioners

Level: beginner to intermediate

Duration: 4h – afternoon session (physical presence)

Those interested to the tutorial can register at the following link <https://www.isprs2022-nice.com/index.php/participate-submit/#register>

**Early bird registration deadline March 11, 2022**

Please circulate the info among your colleagues and anyone who might be interested.

On Behalf of WGII/9 officers,

Best regards,

Fabio

\*\*\*\*\*

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Web: [http://www.researchgate.net/profile/Fabio\\_Menna](http://www.researchgate.net/profile/Fabio_Menna)

Web: <http://www.fbk.eu>

Web: <http://3dom.fbk.eu/>

Web: <http://www2.isprs.org/commissions/comm2/wg9.html>

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**CALL FOR PAPERS: SILK ROAD TEXTILES  
UNDER THE MICROSCOPE, 6<sup>TH</sup> SYMPOSIUM  
OF THE INTERNATIONAL ASSOCIATION  
FOR THE STUDY OF SILK ROAD TEXTILES  
(IASSRT), OCTOBER 20–21, 2022 ONLINE  
(ZOOM), HANGZHOU, NEW YORK,  
CALIFORNIA, BANGKOK, BEIJING**

Textiles and clothing may reveal much of their history through their materials, techniques, and construction. They can tell us where and how they were made, by and for whom they were designed, their intended uses, and subsequent repurposing. This conference, "Silk Road Textiles Under the Microscope," invites close studies of textile productions and circulations along the land and maritime Silk Routes. These studies may include but are not limited to analysis of fibers, dyes, metal threads, weavings, looms, as well as patterns and design. We welcome interdisciplinary research across material culture and science, history of art and textiles, ethnography, and archeology. We hope these studies will bring to the forefront regional craft practices, the evolution of designs and technologies, and their spread through trade and migrations.

This year marks the 6th annual International Symposium of IASSRT. The 5th IASSRT Symposium, "Textiles on the Silk Roads: from Medieval to Industrial Periods" (Nov 15–17, 2021), was successfully held in a hybrid format and was co-hosted by Centro Studi Martino Martini, University of Trento, and China National Silk Museum in Hangzhou. Similarly, the 6th IASSRT Symposium will combine online and in-person formats. This year, six organizations will jointly host it in Hangzhou, Beijing, Bangkok, and New York. There will be two days of online lectures with virtual tours about the co-organizers' institutions.

**CO-ORGANIZERS:**

International Association for the Study of Silk Road Textiles (IASSRT)  
China National Silk Museum (NSM), Hangzhou  
Department of Textile Conservation, Metropolitan Museum of Art (The Met), New York  
Tracing Patterns Foundation (Tracing Patterns), California  
Queen Sirikit Museum of Textiles (QSMT), Bangkok  
Institute for the History of Natural Science, Chinese Academy of Sciences (IHNS),  
Beijing

**CO-CHAIRS:** Janina Poskrobko (The Met), Piyavara Teekara Nateno (QSMT),  
Baichun Zhang (IHNS), Feng Zhao (NSM)

**SUBMISSION GUIDELINES**

Textile/ art/ social historians and textile scholars/ conservators are invited to submit a lecture proposal. Some possible textile-focused topics may include, but are not limited to:

- \* Scientific research and analysis
- \* Conservation
- \* Materials and Techniques
- \* Design innovations and distributions of patterns

**Send the following materials to Irene Lu (NSM, China) at [570096636@qq.com](mailto:570096636@qq.com).**

1. Registration Information (see below)
2. Lecture title and abstract (between 250–350 words)
3. One key image from lecture (jpeg format with caption)
4. One-page CV

**Registration Information**

- First Name
- Last Name
- Title
- Gender Pronouns
- Position and Institutions
- Nationality
- Email
- Personal photo (a head shot)

**SUBMISSION DEADLINE: June 15, 2022. Accepted proposals will be notified by July 15.**

**CONTACTS for general inquiries**

Delphine Li: [lijinfang@cnsilkmuseum.org](mailto:lijinfang@cnsilkmuseum.org) (NSM, China)  
Sandra Sardjono: [sandra.sardjono@gmail.com](mailto:sandra.sardjono@gmail.com) (Tracing Patterns, USA)

\*\*\*\*\*

Alexandra Barlow  
Assistant Conservator  
Metropolitan Museum of Art, Textile Conservation Department  
New York NY  
(415) 336-8646

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**Please find details below and more information through the following link:**  
**[iasrt.iidos.cn/detail/iasrt\\_news/237.html](http://iasrt.iidos.cn/detail/iasrt_news/237.html)**



**THE PARTHENON MARBLES CASE AND**  
**THE UNIVERSAL MUSEUM MYTH:**  
**POLICIES AND POLITICS, THURSDAY,**  
**APRIL 28, CARDOZO SCHOOL OF LAW,**  
**NEW YORK**

The Cardozo Arts & Entertainment Law Journal, the FAME Center and the Benjamin B. Ferencz Human Rights and Atrocity Prevention Clinic invite you to:

The Parthenon Marbles Case and the Universal Museum Myth: Policies and Politics

Thursday, April 28

9:30 a.m. to 4:45 p.m.

Cardozo School of Law, 55 Fifth Avenue, New York, New York 10003

This symposium will bring together leading scholars and advocates to discuss the history of cultural property, their rightful owners and whether the property should be returned to the original creating country. Professor David Rudenstine will present his decades-long historical research challenging the British Museum's claim in the cultural property dispute between Greece and Great Britain over the Parthenon Sculptures taken to London in the early 1800s by the British ambassador, Lord Elgin.

Dean Melanie Leslie will make opening remarks.

Panel 1: 9:30 a.m.

History Surrounding the Removal of the Sculptures and the U.K.

Purchase of Elgin's Collection

Moderator: Samantha Anderson, Director of Legal Services, Art Intelligence Global, LLC

Panelists: Elena Korika, Honorary Director General, Antiquities and Cultural Heritage of the Hellenic Ministry of Culture and Sports; David Rudenstine, Professor, Cardozo School of Law; Giovanna Bellesia, Department Chair of Italian and German Studies, Smith College

Panel 2: 11:00 a.m.

Should the British Museum Return the Collection to Athens?

Moderator: Michael McCullough, Pearlstein & McCullough LLP

Panelists: Irimi Stamatoudi, Professor, University of Nicosia; Elizabeth Marlowe, Professor, Colgate University; Kris Tytgat, President, International Association for the Reunification of the Parthenon Sculptures

Luncheon Address: 12:30 p.m.

Panelists: Dimitrios Pandermalis, President, Acropolis Museum and Lina Mendoni, Minister of Culture and Sports, Cabinet of Kyriakos Mitsotakis

Panel 3: 1:30 p.m.

The Universal Museum Myth

Moderator: Irini Stamatoudi, Professor, University of Nicosia

Panelists: Patty Gerstenblith, Professor, DePaul College of Law; Elena Korika, Honorary Director General, Antiquities and Cultural Heritage of the Hellenic Ministry of Culture and Sports; Joe Baker, Co-Founder and Executive Director, Lenape Center

Panel 4: 3:15 p.m.

Cultural Property & International Human Rights Trends

Moderator: Sandy Cobden '90, Deputy General Counsel, Pactiv Evergreen Inc.

Panelists: Lawrence Kaye, Managing Member, Kaye Spiegler PLLCP; Leila Amineddoleh, Founder, Amineddoleh & Associates LLC; Kristen Carpenter, Professor of Law, University of Colorado

Reception to follow the event.

New York State CLE Credit pending.

Additional program participants will likely be added. Please direct all questions to Cecily D'Amore at [symposium@cardozoelj.com](mailto:symposium@cardozoelj.com).

**Please visit the site: <https://www.eventbrite.com/e/the-cardozo-arts-entertainment-law-journal-parthenon-marbles-tickets-255403808667> [Go there to register]**

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**INTERNATIONAL SYMPOSIUM**  
**“PREHISTORIC, ANCIENT AND MEDIEVAL**  
**MEDICINE: NEW PERSPECTIVES AND**  
**CHALLENGES FOR THE TWENTY FIRST**  
**CENTURY”, 21<sup>ST</sup> – 24<sup>TH</sup> SEPTEMBER 2022,**  
**INSTITUTE FOR HISTORY OF MEDICINE**  
**AND FOREIGN LANGUAGES, FIRST**  
**FACULTY OF MEDICINE, CHARLES**  
**UNIVERSITY, PRAGUE, CZECH REPUBLIC,**  
**CALL FOR PAPERS, FIRST CIRCULAR**

Dear colleagues,

This is to invite you for the conference on prehistoric to medieval medicine - see below the first circular/call for papers. Share it with your colleagues, please.

The submission deadline was extended for one month, until 30th April.

Your paper and poster proposals are welcome!

With kind regards,

Tomas Alusik

First Faculty of Medicine, Charles University Prague, Czech Republic

International Symposium  
\*PREHISTORIC, ANCIENT AND MEDIEVAL MEDICINE: NEW PERSPECTIVES  
AND CHALLENGES FOR THE TWENTY FIRST CENTURY\*  
21<sup>st</sup> – 24<sup>th</sup> September 2022  
Institute for History of Medicine and Foreign Languages  
First Faculty of Medicine  
Charles University  
Prague, Czech Republic  
\*CALL FOR PAPERS \*  
\*FIRST CIRCULAR\*

This interdisciplinary symposium, the sixth in the series of collaborations and originally planned to be held in September 2020, aims to bring together scholars of different disciplines and specialisations who are interested in various aspects of medicine in the prehistoric, ancient, and medieval world as broadly defined. Participants are encouraged to present a wide spectre of papers from new research projects, both from the field and

laboratory-based, together with more theoretical and/or methodological approaches, as well as new methods and their applications. Interdisciplinary topics are especially welcomed. Discussion will be led by three invited keynote speakers.

**\*Aim of the symposium:\***

The last few decades have brought new advances in scientific methods and possibilities of research and interpretation of new data. It also allows for the re-evaluation of old traditional perspectives related to the archaeology and history of medicine from the oldest prehistory until the end of the medieval period.

The history and archaeology of medicine of the periods in question is an interdisciplinary specialisation with a broad spectre of sources. These include archaeological sites and artefacts, human skeletal remains, texts and iconography, thus combining subjects and research methods from the humanities, medical and natural sciences. The symposium aims to bring together scholars from these various backgrounds and different perspectives.

Papers presented at the conference can address, but are not limited, to the following topics:

- Methodologies and techniques, theoretical viewpoints, as well as applications of new scientific methods as applied to the research
- The evidence for the practice of medicine, such as medical interventions, surgery and remedies
- The challenges in the recognition of medicine in the archaeological record
- The preventive aspects of the use of medicine, such as the care of the sick or personal hygiene and their identification in the archaeological record
- The social and religious aspects of healing
- Healers and practitioners
- Healing places
- The state of health of the populations in the periods in question
- Excavation or survey reports of the sites focused or related to the medical practice

We welcome a wide spectrum of papers presenting different perspectives including interdisciplinary, for example, bioarchaeological approaches, as well as case studies. Please feel free to discuss your topic with us.

For the conference programme, the papers will be grouped into the three main chronological periods: 1) Prehistory; 2) Antiquity; and 3) the Medieval world.

**\*Location:\***

The symposium will be held at the First Faculty of Medicine, Charles University, with sessions held in the Institute for History of Medicine and Foreign Languages (U Nemocnice 4, Prague 2).

Full details of recommended accommodation and other practical arrangements will be available by the end of May 2022 for those who have registered.

\*In the event of a continuation of the COVID-19 pandemic, the symposium will be held in hybrid or completely online form, through a standard videoconference software (such as Zoom or Microsoft Teams). The organisers will inform all participants in good time, if this change is necessary.\*

**\*Papers, posters and workshops:\***

Other than the keynote speakers, twenty minutes will be allocated to each paper, plus ten minutes for discussion. The language of the symposium will be English. There will be unlimited space for posters (size A0, 120 x 85 cm), on any topic related to the themes. Posters will be formally presented at a time reserved for this in the symposium programme. Should there be more papers submitted than there is time on the symposium programme, the organisers reserve the right to ask some authors to present their topics as posters. We also invite proposals by those wishing to organise specialist workshops within any theme of the symposium.

**\*Academic programme:\***

\*Tuesday 21<sup>st</sup> September c. 14:00 till Saturday 24<sup>th</sup> September 18.00 – \*presentation of papers and posters; visit of the Anatomical Museum of the Institute of Anatomy, Stomatological Museum of the Department of Stomatology; the historical collections of the Institute for History of Medicine and Foreign Languages and the Medical Museum of the National Medical Library.

**\*Social programme:\***

\*Tuesday 21<sup>st</sup> September evening\* – informal meeting and dinner (paid by the individual participants) in the restaurant close to the symposium venue.

\*Thursday 23<sup>rd</sup> September evening\* – official Symposium Dinner in a restaurant in the historical centre of Prague, not far from the symposium venue.

\*Sunday 25<sup>th</sup> September\* – excursion to the historical centre of Prague (free; guided by the local organisers).

**\*Symposium fee:\***

The symposium fee of €70, includes admission to the symposium, abstracts of papers and posters, the symposium programme, all refreshments during the breaks and the Symposium Dinner. The fee is to be paid by the end of June 2022.

**\*Keynote speakers:\***

Three leading scholars are being invited to be the keynote speakers or hold an evening lecture. Their names and lecture topics will be specified in the second circular.

**\*Registration:\***

Offers of papers, posters and workshops and provisional requests to participate should be sent to the email address below by \*30th April 2022\*.

**\*ORGANISING COMMITTEE:\***

- \*Prof. Assoc. Karel Cerny, PhD. (First Faculty of Medicine, Charles University) \*
- \*Prof. Assoc. Tomas Alusik, PhD. (First Faculty of Medicine, Charles University) \*
- \*Dr. Andrej Shbat, MA, PhD. \*(First Faculty of Medicine, Charles University) \*
- \*Lucie Buresova, BA, MA, MSc. (First Faculty of Medicine, Charles University) \*
- \*Professor Robert Arnott (Green Templeton College, University of Oxford) \*
- \*Mag.Dr. Rupert Breitwieser (Altertumswissenschaften, Universität Salzburg) \*

**\*SYMPOSIUM Administration\***

Provisional Registrations/ Further Information:  
Prof. Assoc. Tomas Alusik, PhD.  
Institute for History of Medicine and Foreign Languages  
First Faculty of Medicine  
Charles University  
U Nemocnice 4, CZ-12108  
Czech Republic

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

### **NON-STIPENDIARY RESEARCH ASSOCIATESHIPS**

The British School at Athens proposes to appoint two Non-Stipendiary Research Associates from 1st September 2022.

Each position is tenable for up to two years and is open either to UK-based researchers or to Greek-based researchers who completed a doctorate at a UK HEI. Candidates should be in receipt of a PhD at the time of taking up the award, should have been awarded their doctorate no more than five years before 1st September 2022, and should not yet have held a university position or similar post with a research component. Those wishing to have a career break taken into account may declare a period of interruption by parental leave, caring commitments, illness, or other circumstances.

Candidates' research should be concerned with any area covered by the BSA's mission statement. Research Associates who are appointed to full-time positions at other institutions with a research component during the course of their award will be expected to resign it, so that fresh appointments may be made. These positions are non-renewable and there is no requirement to reside in Athens.

The positions are non-stipendiary but Research Associates are entitled to:

- a £500 research allowance
- a BSA institutional e-mail address
- access to BSA library resources via VPN
- a research profile on the 'People' page of the BSA website
- a speaker slot in a virtual lecture as part of the Upper House seminar series
- the opportunity to book accommodation in the BSA hostel (in Athens or at Knossos)

Applicants are required to submit a short summary of research, a CV and one letter of reference. They should also ask a referee to write on their behalf before the application closing date. The deadline for applications is 31 May 2022.

For more information and for details on how to apply to this scheme, please visit:  
<https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.bsa.ac.uk%2Fawards%2Ffellowships%2Fresearchassociate%2F&data=04%7C01%7Caegeanet%40lists.ku.edu%7C7097d7c9d7044517edfe08da065071f1%7C3c176536afe643f5b96636feabbe3c1a%7C0%7C0%7C637829239820531023%7CUnknown%7CTWFpbGZsb3d8eyJWljojMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6IjEhaWwiLCJXVCi6Mn0%3D%7C3000&data=DpdMVI3XYodJPlOkO2CqbwTbCeeXvR%2FtX6objHDqjAU%3D&reserved=0>

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Dr Michael Loy | Assistant Director | British School at Athens

<https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.bsa.ac.uk%2F&data=04%7C01%7Caegeanet%40lists.ku.edu%7C7097d7c9d7044517edfe08da065071f1%7C3c176536afe643f5b96636feabbe3c1a%7C0%7C0%7C637829239820531023%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ikl1haWwiLCJXVCI6Mn0%3D%7C3000&sdata=tX%2F%2FERNAZGVbm7AjlLDBPta3U%2FGPx2QkqU%2ByxMVU2UE%3D&reserved=0>

Souedias 52 | 10676 Athens | Greece  
T: +30 211 1022 804 | F: +30 211 1022 803

My office hours for answering BSA-related enquiries are Mon–Fri 10am–1:30pm (UTC+2)

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## **PHD POSITION, THE PROJECT ZODIAC - ANCIENT ASTRAL SCIENCE IN TRANSFORMATION" (ERC), INSTITUTE FOR THE HISTORY OF KNOWLEDGE IN THE ANCIENT WORLD, FU BERLIN)**

The project ZODIAC - Ancient Astral Science in Transformation" (ERC) based at the Institute for the History of Knowledge in the Ancient World (FU Berlin) invites applications for a PhD position (3.5 years).

[https://www.fu-berlin.de/universitaet/beruf-karriere/jobs/english/GK-PhD\\_ZODIAC\\_2022-E.html](https://www.fu-berlin.de/universitaet/beruf-karriere/jobs/english/GK-PhD_ZODIAC_2022-E.html)

The successful applicant will collaborate with Principal Investigator Mathieu Ossendrijver and the ZODIAC team to pursue a PhD project on ancient mathematical astronomy. The preferred topic of the PhD project is to evaluate and interpret developments in the accuracy of astronomical prediction in Babylonia and Greco-Roman Egypt. Preference will be given to candidates with a background in an exact science (astronomy, physics, mathematics, informatics) and a field of ancient philology (Assyriology; classics; Demotic) or history of science. Exceptional candidates without a background in ancient world studies or exact science and other PhD projects on ancient mathematical astronomy within the chronological and geographical scope of ZODIAC will also be considered.

The PhD position offers a unique opportunity to work in an international and interdisciplinary research environment. The successful applicant will be based at ZODIAC and enrolled in the doctoral program Ancient Philosophy and History of Ancient Science (APhil/HistAS) of the Berlin Graduate School of Ancient Studies (BERGSAS, [www.berliner-antike-kolleg.org/en/bergsas](http://www.berliner-antike-kolleg.org/en/bergsas)). The prospective starting date is 1 July 2022 or as soon as possible thereafter.

### **Job description:**

- \* complete a PhD project on ancient mathematical astronomy
- \* participate in ZODIAC research meetings, contribute to the development of ZODIAC's research infrastructure
- \* enroll in the Berlin Graduate School of Ancient Studies (BERGSAS)
- \* present own research at conferences and workshops
- \* participate in the organisation of ZODIAC workshops, public outreach and social media activities related to the PhD project

### **Requirements:**

Master's degree in an exact science (e.g. astronomy, physics, mathematics, informatics) and/or an equivalent degree in another area relevant to the PhD project (history of science, Assyriology, classics, Egyptology)

### **Desirable:**

- \* master's degree in an exact science (astronomy, physics, mathematics, informatics)
- \* bachelor or master's degree or documented skills in a relevant field of ancient philology (Assyriology; classics; papyrology; Demotic)
- \* experience with or interest in astronomical computation, both ancient and modern
- \* very good analytical skills, relevant programming skills and academic writing skills
- \* ability to work independently, good communicative skills, and team spirit
- \* excellent English language skills (written and oral)
- \* strong motivation to complete a PhD dissertation in 3.5 years

**Applicants should include:**

- \* cover letter
- \* complete curriculum vitae including list of publications if applicable
- \* relevant certificates and documentation of qualification
- \* exposé (max. 3 pages plus references) with an outline of the proposed dissertation project and research ideas
- \* writing samples (MA thesis, papers, and/or publications) totalling at least 20 pages
- \* names and contact details of two referees (those of shortlisted candidates will be contacted to provide letters of recommendation)

Applications should be sent by e-mail, together with significant documents, indicating the reference code, in PDF format (preferably as one document) to Herrn Dr. Mathieu Ossendrijver: [wissensgeschichte@geschkult.fu-berlin.de](mailto:wissensgeschichte@geschkult.fu-berlin.de)

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## **SCIENTIST FOR PAINTINGS EXAMINATION** **– ORGANIC ANALYST (MATERNITY** **COVER) - 14 HOURS PER WEEK**

Salary: The pro-rated salary at 14 hours per week is 14,626 GBP (FTE 36,565 GBP per annum)

**Application closes on 13<sup>th</sup> April 2022**  
**Interviews on 22<sup>nd</sup> April 2022**

The National Gallery seeks to recruit a highly motivated individual to join the Scientific Department to conduct analytical research on the Collection. The role will be focused specifically on the examination and identification of organic materials in paintings and investigation of their ageing and deterioration in support of conservation work and to inform collection care and other technical research including work for the scholarly cataloguing, exhibition programmes and for public engagement activities.

The jobholder will be an experienced specialist in the field of technical examination of paintings and will undertake analysis of paint micro-samples using a range of chromatographic, spectroscopic and microscopic techniques, as well as the non-invasive methods available at the National Gallery. The jobholder will provide expert advice to conservators based on interpretation of these results within a broad knowledge of the chemical composition and history of use of painting materials, to enable evidence-based decisions during cleaning and restoration.

The postholder will represent the National Gallery as an expert in the scientific analysis of works of art, including publishing and presenting research outcomes internally and externally to a variety of audiences at a national and international level. As time permits, the jobholder may also initiate and carry out historical technical research to advance knowledge on the collection, pursuing independent research projects developing materials studies relating to paintings.

Suitable candidates will have a first degree in an appropriate scientific field and a postgraduate degree in a relevant subject, or equivalent experience. The successful candidate must have excellent analytical, organisational and problem-solving skills, good attention to detail and a high level of dexterity. The jobholder must also have the ability to work effectively in inter-disciplinary teams and to communicate with, and to interpret analytical findings for non-scientists/non-specialists.

The jobholder will be a member of the Scientific Department and will work particularly closely with other members of this team but will also maintain regular contact with colleagues in the Conservation and Curatorial Departments, with whom joint research work is undertaken. During the course of the appointment, the jobholder may also have contact with a number of other departments across the organisation both for collection care matters and for public engagement activities.

This is a fixed term contract of up to 12 months duration to provide maternity cover.

Please see the following link for more information and application details:  
[nationalgalleryjobs.ciphr-irecruit.com/templates/CIPHR/...](https://nationalgalleryjobs.ciphr-irecruit.com/templates/CIPHR/...)

\*\*\*\*\*

Catherine Higgitt  
Principal Scientist  
National Gallery  
London  
[catherine.higgitt@nationalgallery.org.uk](mailto:catherine.higgitt@nationalgallery.org.uk)

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## **ΑΝΑΚΟΙΝΩΣΕΙΣ - ANNOUNCEMENTS**

### **HERITAGE SCIENCE JOURNAL, CALL FOR PAPERS: ADVANCED ANALYTICAL TECHNIQUES FOR HERITAGE TEXTILES**

Textiles and textile-related material constitute an important domain of material culture. Textiles require advanced levels of technology to be produced from the making of threads and their interlocking to produce fabric, to intrinsically made bands, ropes, cordage and strings, nets, felting and even basketry. In addition, people in antiquity used almost any type of fibre available to them locally to make objects like textiles, ropes and baskets. The final products were easy to carry and usually necessary for the transportation of other commodities. A textile is a product of complex interaction between resources, technology and society. Consequently, the study of this material provides information on the economy, technological and cultural developments, trading routes, and the environment of the societies that produced them. The investigation of extant finds is arguably the most direct source of information, that when aided by instrumental analysis gives particularly useful data on material identification, condition assessment and dating of the finds. However, archaeological textiles and related material are rare, excavated finds due to their inherent sensitivity to the conditions prevailing at a burial. Therefore, the application of instrumental analysis holds a key role in the understanding of textile finds and any advancements in scientific analysis can be particularly beneficial when applied to the study of textiles.

This special issue aims to bring together the latest developments on fibre and material identification of heritage textiles. It attempts to shed light on the latest advancement of instrumental analysis and how these can be applied to enable progress in textile research. We welcome contributions of review articles and case studies on the application of analytical techniques like, microscopy; proteomics; synchrotron techniques; imaging techniques (for example micro/CT, X-radiography and 3D scanning); dye analysis; and radiocarbon dating, and other. We also welcome methodological and review articles on analytical techniques and their application to textiles.

#### **Guest Editors:**

**Dr Christina Margariti**, Directorate of Conservation/Hellenic Ministry of Culture,  
[euroweb.wp1@gmail.com](mailto:euroweb.wp1@gmail.com)

**Dr Hana Lukesova**, Department of Collection Management/ University of Bergen,  
[Hana.Lukesova@uib.no](mailto:Hana.Lukesova@uib.no)

**Dr Francisco B. Gomes**, UNIARQ – Centre for Archaeology of the University of Lisbon; School of Arts  
and Humanities of the University of Lisbon, [franciscojbgomes@gmail.com](mailto:franciscojbgomes@gmail.com)

**Please submit abstracts at [euroweb.wp1@gmail.com](mailto:euroweb.wp1@gmail.com) from 14 February 2022 to 30 March 2022** and state whether your Institution can cover OA fees or has a relevant agreement with Springer Nature.

**It will be possible to submit manuscripts from 1 April 2022 to 30 March 2023.**

Please refer to the journal guidelines for further information on how to prepare your article <https://heritagesciencejournal.springeropen.com/submission-guidelines>

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**13<sup>TH</sup> INTERNATIONAL GEOCHRONOLOGY  
SUMMER SCHOOL: DATING TECHNIQUES  
IN ENVIRONMENTAL RESEARCH, 28  
AUGUST – 01 SEPTEMBER 2022,  
MORTERATSCH, SWITZERLAND**

Dear colleagues,

It is our pleasure to announce the 13<sup>th</sup> International Geochronology Summer School:  
Dating techniques in environmental research

Date: 28 August – 01 September 2022

Location: Morteratsch (Switzerland)

**Webinfo:** <http://www.geo.uzh.ch/en/units/gch/geochronologysummerschool.html>

Topics to be covered in lectures, excursions and workshops include dating techniques such as numerical methods (radiocarbon, exposure dating with cosmogenic nuclides, OSL, 137Cs, 210Pb, etc.), dendrochronology, anthracology, archaeomagnetic dating, palaeolimnology, as well as relative methods like soil weathering and Schmidt-hammer technique. See also attached flyer.

**List of Lecturers:**

Holger Gärtner (WSL), Paolo Cherubini (WSL), Markus Egli (University of Zurich), Dmitry Tikhomirov (University of Zurich), Dennis Dahms (University of Northern Iowa), Irka Hajdas (ETH Zurich), Fritz Schlunegger (University of Bern), Evdokia Tema (University of Torino), Natacha Gribenski (University of Bern), Nathalie Dubois (EAWAG) and others.

The Summer School is open to young researchers (PhD students and Post-Docs) worldwide.

Participation is competitive and will be limited to a maximum of 20.

The registration fee (800 CHF) includes accommodation (room sharing required), half board and lunch, field trips and teaching material.

**DEADLINE FOR APPLICATIONS: 30 April 2022**

**Registration:**

<http://www.geo.uzh.ch/en/units/gch/geochronologysummerschool/registration.html>

(PS: we are optimistic that we can carry out this summer school - but depending on the Covid situation we might need to adapt the school format)

# **APPLICATIONS FOR THE ADVANCED MASTERS IN STRUCTURAL ANALYSIS OF MONUMENTS AND HISTORICAL CONSTRUCTIONS (16<sup>TH</sup> EDITION)**

Dear Colleagues,

Please find below information about the Advanced Master Course 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.

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## **APPLICATIONS FOR THE ADVANCED MASTERS IN STRUCTURAL ANALYSIS OF MONUMENTS AND HISTORICAL CONSTRUCTIONS**

Applications for the **Advanced Master in Structural Analysis of Monuments and Historical Constructions** are open up to **May 20, 2022**. This is the leading international course on conservation of heritage structures, winner of the 2017 European Union Prize for Cultural Heritage "Europa Nostra", funded by the European Commission during 10 consecutive years, and a unique opportunity to meet people from all over the world. Do not miss this opportunity to join the other 450 alumni from 75 countries that graduate in the last 15 years and be a part of this great worldwide network of experts!

This Master Course is organized by a Consortium of leading European Universities/Research Institutions in the field, composed by **University of Minho** (coordinating institution, Portugal), the **Technical University of Catalonia** (Spain), the **Czech Technical University in Prague** (Czech Republic), the **University of Padua** (Italy) and the **Institute of Theoretical and Applied Mechanics of the Czech Academy of Sciences** (Czech Republic).

The course combines the most recent advances in research and development with practical applications. A significant number of **scholarships**, ranging from 4,000 to 13,000 Euro, are available to students of any nationality.

Please find full details on the MSc programme, as well as electronic application procedure, in the SAHC website at [www.msc-sahc.org](http://www.msc-sahc.org).

Visit also the SAHC blog <http://blog.msc-sahc.org> and [www.linkedin.com/school/sahcmasterscourse/](http://www.linkedin.com/school/sahcmasterscourse/)

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Yours sincerely,

Paulo B. Lourenco



Course Coordinator

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

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**Check out the books resulting from the SAHC Master Program ([New book in May](#))  
**Finite Element Analysis for Building Assessment: Advanced Use and Practical Recommendations****

Publisher: Routledge

More info: [link](#)

**Historic Construction and Conservation: Materials, Systems and Damage**

Publisher: Routledge

More info: [link](#)

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## A MESSAGE TO THE RADIOCARBON COMMUNITY

Dear Radiocarbon colleagues,

The safety and welfare of our community members is our utmost concern. We have learned of several opportunities for scientists and scholars facing immediate risk due to the war in Ukraine. Below are links to some programs that facilitate work and study abroad. Some are limited to Ukrainians, but others are open to all academics in crisis. Please feel free to reply to this message or post separately if you know of additional opportunities.

Sincerely,

Tim Jull & Kim Elliott  
jull@arizona.edu  
kimelliott@arizona.edu

### **Opportunities for scholars at risk**

1. The Interacademy Partnership: <https://www.interacademies.org/news/iap-communicate-ukraine>
2. Council of At-Risk Academics (CARA) in UK: <https://www.cara.ngo/what-we-do/a-lifeline-to-academics-at-risk/ukraine-crisis/>
3. European Federation of Chemical Engineering (EFCE) in close cooperation with Czech Society of Chemical Engineering (CSCHE) is announcing **the immediate availability of up to 25 fully funded open positions for Ukrainian PhD students in the fields of chemical and biochemical engineering, and in related areas.**

The hosting institutions are:

- Institute of Chemical Process Fundamentals, Czech Academy of Sciences: <https://www.avcr.cz/en/>, <https://www.icpf.cas.cz/en/>
- University of Chemical Technology in Prague: <https://www.vscht.cz/?jazyk=en>
- University of Pardubice, Faculty of Chemical Technology: <https://www.upce.cz/en>
- Brno University of Technology, Faculty of Chemistry: <https://www.fch.vut.cz/en/>
- University of J. E. Purkyne in Usti nad Labem, Faculty of Environment: <https://www.fzp.ujep.cz/en/>

Tuition fees, living fellowships, boarding, social and health care insurance, and other allowances will be provided. Substantial assistance with getting visa for the Czech Republic could be expected. For those who might be interested, will you please use the e-mail of the contact person: [bendova@icpf.cas.cz](mailto:bendova@icpf.cas.cz)  
External Link: <https://globalyoungacademy.net/opportunity-for-ukrainian-scholars-at-risk/>

4. Cambridge University Press offers support to Ukrainian learners and researchers: <https://www.cambridge.org/news-and-insights/news/Statements-on-the-invasion-of-Ukraine>

5. This the latest news from the University of Cambridge. Check the link for [resources](#) for staff and students: <https://www.cam.ac.uk/ukraine>
  6. Here's the University of Arizona's statement on the war in Ukraine: <https://view.comms.arizona.edu/?qs=4e6ebefb972f1965f3385ce46dee3980a648f84867919ffffccee76131d7a95cd8b2d1393616739c7f412c1313a09f3d86158481edef2a63ca2524846c00483fe336a7ae6ee02efb6d432b01ba05f40a>
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## **COURSE ON “CONSERVATION AND PHYSICOCHEMICAL STUDY OF GLAZED POTTERY”**

Dear all,

We are delighted to announce a new course on “[Conservation and Physicochemical Study of Glazed Pottery](#)” organized by the Faculty of Archaeology, Leiden University (NL), the Netherlands Institute at Athens (NIA), the Ephorate of Antiquities of Euboea (Chalkis), and the Greek Research Centre/Laboratory ‘NCSR Demokritos’ at Athens. The course provides a unique opportunity for BA, MA, RMA and PhD students to gain more knowledge and a hands-on experience in conservation of glazed pottery. It guides the participants through Byzantine/Post Medieval history and technology of Byzantine pottery in Greece, and through stages of the study, conservation, restoration and documentation of archaeological artifacts. The practical classes will be based on authentic pottery finds from Euboea (GR). In addition, a first approach of physicochemical analyses will be presented. All teaching will be in English.

During 3 May-4 June 2022, online classes will be streamed (live) and during Augustus 2022 the practical workshop will take place in Athens and Chalkis in Greece. The online classes are open to all eligible students, but the practical workshop is for max. 10 students. For these last students it is obligatory to do the online classes in advance as preparation for the practical workshop.

For more information and registration please check:

<https://nia.gr/en/course-conservation-and-physicochemical-study-of-glazed-pottery-online-classes-3-may-4-june-2022-workshop-in-greece-august-2022/>

Deadline for applications: **27 April 2022!**

We would appreciate it if you could forward this information to anyone who might be interested and we remain at your disposal should you need further information.

Sincerely,

**Emmy Mestropian-Makri**

Secretary

**Netherlands Institute at Athens**

Makri 11

117 42 Athens

Tel.: +30 210 9210760

Fax: +30 210 9210770

[E-mail: nia@nia.gr](mailto:nia@nia.gr)

## *INTERNET SITES*

# **ARIADNE--RESEARCH INFRASTRUCTURE FOR ARCHAEOLOGY**

ARIADNE is a research infrastructure for archaeology. Its main objective is to support research, learning and teaching by enabling access to digital resources and innovative new services. It does this by maintaining a catalogue of digital datasets, by promoting best practices in the management and use of digital data in archaeology, by offering training and advice, and by supporting the development of innovative new services for archaeology.

The datasets that are registered in the ARIADNE catalogue are held by its partners and have been created through research, in excavations, in fieldwork, laboratory and other projects. In recent years archaeologists have been making increasing use of sophisticated digital equipment and techniques. During the course of a research project large volumes of data are created and collected, and become part of the research archive. ARIADNE aims to make these archives available through its portal for researchers to consult when starting new research.

### **ARIADNE portal**

The ARIADNE Portal offers a central point of access to the archaeological resources made available from partner institutions throughout Europe. Behind the portal lie the ARIADNE registry and a set of services that are used to manage information about the datasets, collections, vocabularies, metadata schemas and mappings.

The registry is used to gather information about data resources and services, and to support the search functionalities offered by the portal. Partners provide a description of their digital resources based on the ARIADNE Catalog Data Model (ACDM), which is used to include the resource in the registry.

### **Disclaimer**

Whilst we have used best efforts to ensure the accuracy of resources catalogued by the ARIADNE portal, we explicitly disclaim to the extent permitted by law any responsibility for the accuracy, content, or availability of information located through use of the Portal, or for any damage incurred owing to use of the information contained therein.

Information located through use of the Portal may be subject to specific use constraints, as advised by the data publishers. It is the responsibility of potential and actual users to be aware of such constraints and to abide by them. By making use of material on this web server, including the contents of the Portal, you accept these provisions.

If you notice a mistake in one of the catalogue records or linked resources, then comments should be addressed to the data publisher, not to the ARIADNE consortium.

## **Guide**

Have a look at the ARIADNE portal guide for information and help on how to search and navigate the portal.

## **For more information**

About the ARIADNE research infrastructure please see our project website:  
<https://www.ariadne-infrastructure.eu> .

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## **ΝΕΕΣ ΕΚΔΟΣΕΙΣ – NEW PUBLICATIONS**

# **MACROSCOPIC CHOP MARK IDENTIFICATION ON ARCHAEOLOGICAL BONE: AN EXPERIMENTAL STUDY OF CHIPPED STONE, GROUND STONE, COPPER, AND BRONZE AXE HEADS ON BONE**

by Tiffany R. Okaluk\* and Haskel J. Greenfield Department of Anthropology, St. Paul's College, University of Manitoba, 70 Dysart Road, Winnipeg, MB R3T 2M6, Canada; [haskel.greenfield@umanitoba.ca](mailto:haskel.greenfield@umanitoba.ca)

\* Correspondence: [tiffanyokaluk@gmail.com](mailto:tiffanyokaluk@gmail.com)

**Abstract:** This paper presents a new macroscopic method for identifying chop marks on archaeological faunal assemblages and highlights the major differences in the morphology of chop marks created by stone and metal axes. The method provides macroscopic criteria that aid in the identification of both complete and incomplete chop mark types as well as the raw material of the axe. Experiments with modern stone (chipped and ground) and metal (copper and bronze) axes found that the degree of fragmentation within a chop mark is related to both the width and sharpness of the axe and can be classed on a scale from 1–5 using a variety of criteria.

The experiments demonstrate that sharp chipped stone axes are fragile (often break upon impact) and do not create clean and well-defined chop marks. Ground stone axes are more durable but tend to create very fragmented chop marks without a clean cut (sheared) surface. Unalloyed copper metal axes can create sheared chopped surfaces; however, the relatively soft metal creates more crushing at the point of entry than bronze axes. In contrast, bronze axes are durable and create chop marks with exceptionally low rates of fragmentation resulting in a clean-cut sheared surface that extends into the bone for more than 3 mm. The method is applied to the faunal assemblage from the Early Bronze Age site of Göltepe, Turkey to determine whether the chop marks on bones were made by stone or metal axes at this early metal processing settlement. The results suggest that many of the chop marks were made by metal implements (e.g., axes). Hence, this method provides another means to monitor the adoption rates of new raw materials at a time when both metal and stone axes coexisted.

Please visit the site: <https://www.mdpi.com/2571-550X/5/1/15/pdf> to download the article

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# **FROM CHRONOLOGICAL NETWORKS TO BAYESIAN MODELS: CHRONOLOGY AS A FRONT-END TO OXCAL, RADIOCARBON, VOL 64, NR 1, 2022, P 101–134**

DOI:[10.1017/RDC.2021.114](https://doi.org/10.1017/RDC.2021.114)

E Levy<sup>1\*</sup> • E Piasezky<sup>1</sup> • A Fantalkin<sup>1</sup> • Finkelstein<sup>2,1</sup>

<sup>1</sup>Tel Aviv University, Archaeology and Ancient Near Eastern Cultures, Tel Aviv 69978, Israel

<sup>2</sup>School of Archaeology and Maritime Cultures, University of Haifa, Mount Carmel, Haifa 3498838, Israel

## **ABSTRACT**

We present a new method for creating an OxCal Bayesian model that bypasses the complex task of writing OxCal code. Our methodology employs the recent CHRONOLOG software as a graphical front-end for generating OxCal scripts. This approach enables archaeologists to create complex Bayesian models—including termini post and ante quem, duration bounds and synchronisms—with the help of a user-friendly interface. The target audience can be divided into beginners, who might struggle to create chronological models using OxCal directly, and experienced OxCal users, who should find that CHRONOLOG saves time when coding complex models. Three case-studies from recent publications are presented.

**KEYWORDS:** Bayesian modeling, ChronoLog, chronology, OxCal, radiocarbon dating.

**Please visit the site:**

<https://www.cambridge.org/core/journals/radiocarbon/article/from-chronological-networks-to-bayesian-models-chronolog-as-a-frontend-to-oxcal/4A082D5DDD43B395D476D4DE3C3613B6>

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## **VOLUME 2 ADVANCES IN ARCHAEOLOGICAL MATERIALS**

Dear all,

I am pleased to draw your attention to Volume 2 of *Advances in Archaeological Materials* that has just been published:

<https://www.sciencedirect.com/journal/advances-in-archaeological-materials/issues>

We are welcoming submissions and proposals for special issues. Please note that currently there is no word limit, no figure limit, and all articles are open access. Additional details can be found in the Guide for Authors (<https://www.keaipublishing.com/en/journals/advances-in-archaeological-materials/guide-for-authors/>). Thanks very much!

Regards,

Brett Kaufman

Email: [bkaufman@ucla.edu](mailto:bkaufman@ucla.edu)

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## **NEW INSIGHTS ON COMMEMORATION OF THE DEAD THROUGH MORTUARY AND ARCHITECTURAL USE OF PIGMENTS AT NEOLITHIC ÇATALHÖYÜK, TURKEY**

E. M. J. Schotsmans, G. Busacca, S. C. Lin, M. Vasić, A. M. Lingle, R. Veropoulidou, C. Mazzucato, B. Tibbetts, S. D. Haddow, M. Somel, F. Toksoy-Köksal, C. J. Knüsel & M. Milella

Scientific Reports volume 12, Article number: 4055 (2022)

### **ABSTRACT**

The cultural use of pigments in human societies is associated with ritual activities and the creation of social memory. Neolithic Çatalhöyük (Turkey, 7100–5950 cal BC) provides a unique case study for the exploration of links between pigments in burials, demographic data and colourants in contemporary architectural contexts.

This study presents the first combined analysis of funerary and architectural evidence of pigment use in Neolithic Anatolia and discusses the possible social processes underlying the observed statistical patterns. Results reveal that pigments were either applied directly to the deceased or included in the grave as a burial association. The most commonly used pigment was red ochre. Cinnabar was mainly applied to males and blue/green pigment was associated with females. A correlation was found between the number of buried individuals and the number of painted layers in the buildings.

Mortuary practices seem to have followed specific selection processes independent of sex and age-at-death of the deceased.

This study offers new insights about the social factors involved in pigment use in this community, and contributes to the interpretation of funerary practices in Neolithic Anatolia. Specifically, it suggests that visual expression, ritual performance and symbolic associations were elements of shared long-term socio-cultural practices.

Please visit the site: <https://www.nature.com/articles/s41598-022-07284-3#Fig2> [Go there for link to download] [Story at: <https://www.heritagedaily.com/2022/03/researchers-reveal-the-burial-rituals-of-the-oldest-city-in-the-world/143081>]

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## **EΙΔΗΣΕΙΣ - NEWS RELEASE**

# **RARE PHOENICIAN SARCOPHAGUS COVERED BY RABAT TRENCHING WORKS EXCAVATED, BY MATTHEW VELLA**

600BC Phoenician stone sarcophagus discovered 21 years ago being examined by University and heritage experts over fears of damage from increased roadworks

A rare Phoenician stone sarcophagus from 600BC excavated since last summer at Ghajn Klieb, outskirts of Rabat, is being examined by the University of Malta, Heritage Malta and the Superintendence of Cultural Heritage.

Sarcophagi feature very rarely in Maltese archaeology. The previous discovery happened some 300 years ago.

The tomb containing the sarcophagus was discovered by accident during trenching works in 2001. At the time, the decision was taken to preserve in situ with the Superintendence monitoring the area.

When the sarcophagus was opened, it was found to contain the remains of two individuals, possibly a male and a female, one of whom was wearing jewellery made of a metal alloy. A small number of Phoenician pottery vessels and an animal inhumation were also discovered within the burial chamber.

But increased development pressures to improve infrastructural services in the area during the last months led to the decision by the Superintendence to investigate the site and ensure the best use of the available resources in view of the rarity of the find.

All the objects in the sarcophagus itself were extracted from the tomb chamber and transported to the Superintendence's laboratories in Valletta and Heritage Malta's laboratories in Bighi.

“All the objects are also being analysed by specialists from the three entities so that the information extracted from the artefacts will eventually shed more light on the Phoenician culture to which the people buried here belonged,” Kurt Farrugia, Superintendent of Cultural Heritage, said.

“The decision to investigate the burial site at Ghajn Klieb was taken in view of the substantial infrastructural works planned for the area, which could compromise the site's integrity.”

The studies will be extended to include other tombs discovered in the immediate area in recent years, to provide a more comprehensive perspective. Currently, the Superintendence is carrying out conservation and analysis of the pottery artefacts and skeletal remains found in these tombs.

Professor Nicholas Vella, from the Department of Classics and Archaeology at the University of Malta, spoke of the importance of this discovery.

“Għajn Klieb in Rabat has long been known to be the site of a long-lived burial complex dating back to Phoenician times. Many of the tombs were explored a century ago, often without a clear record being kept of what was found.

“The University of Malta is delighted to have been invited to collaborate in the exploration and study of this tomb, with its unique stone sarcophagus and the goods that were placed to accompany the two individuals buried inside it. This research will throw light on the death rituals prevalent in Malta in the second half of the seventh century BC.”

Noel Zammit, Heritage Malta’s Chief Executive Officer, said that Heritage Malta conservators were currently working on the sarcophagus and the metal objects discovered on site.

“Plans are underway for a temporary exhibition at the National Museum of Archaeology later this year, where some of the objects would be exhibited for the public to appreciate and enjoy them as soon as possible. The sarcophagus and the related artefacts will then be on permanent display – possibly at St Paul’s Catacombs – for constant public accessibility.”

**Please visit the site:**

<https://www.maltatoday.com.mt/news/national/115361/rare-phoenician-sarcophagus-covered-by-rabat-trenching-works-excavated#.YiTWGHrMJ3h> [Go there for pix]

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## **HOW DID ANCIENT CIVILIZATIONS MAKE SENSE OF THE COSMOS, AND WHAT DID THEY GET RIGHT? BY SUSAN BELL**

In the spring of 1900, a group of Greek sponge divers, blown off course by a storm in the Aegean, stumbled upon the wreck of an ancient Roman ship loaded with treasure that had sunk more than 2,000 years earlier off the remote Greek island of Antikythera. Returning the following year to retrieve its precious cargo, the divers were forced to end their mission when one died of the bends and two were paralyzed—but not before they succeeded in bringing to the surface a spectacular haul of antiquities.

Among them were bronze and marble statues, fine jewelry and glassware, and—most exciting of all—a startlingly complex cosmological calculator: the Antikythera mechanism.

The world's oldest analog computer and one of the most remarkable scientific objects of antiquity ever found, the mechanical model of the solar system is thought to date to between the third and first centuries B.C. Now fractured into 82 known fragments, there is surviving evidence of 30 bronze gears. However, researchers believe this highly sophisticated device originally included at least 69 intricately engineered meshing gears that enabled the ancient Greeks to track the phases of the moon and the positions of the planets, and even to predict the timing of lunar eclipses decades in advance.

But if the Antikythera mechanism can be considered a stunning embodiment of the ancient Greeks' impressive grasp of astronomy, it drew heavily upon the learning of a much earlier civilization in its use of the 19-year lunisolar cycle.

"The device exemplifies a terrific achievement of synthesis in incorporating complex bodies of observational and theoretical knowledge, much of it deriving ultimately from the Babylonian tradition, and long preceding Greek interests in astronomy," says USC Dornsife's Lucas Herchenroeder, associate professor (teaching) of classics.

Considered the world's first-known astronomers, the ancient Babylonians were avid stargazers. Some 6,000 years ago, they erected watch towers to scan the night sky, mapped the stars and visible planets and recorded their observations on clay tablets. Their meticulously compiled data provided the foundation to create the first calendars, used to organize the growing and harvesting of crops and the timing of religious ceremonies.

Although their vision of the universe was based on mythological beliefs, the Babylonians' astronomical observations and predictions were astoundingly accurate. They were the first-known people to predict eclipses. They could track and predict the relative movements of the sun, the moon, Mercury and Venus. And—like the ancient Egyptians—they successfully calculated the length of a year.

How did ancient civilizations accomplish these feats of knowledge without the benefit of telescopes, satellites or computer technology?

The old-fashioned way: through careful observation, generational record-keeping, pattern recognition and early mathematics. Here we explore what they got right—and wrong—about the cosmos.

### **The world was their oyster**

If the Babylonians' astronomical calculations were remarkably precise by modern standards, their understanding of the cosmos was very far removed from our own. As Arthur Koestler explains in his seminal history of Western cosmology, *The Sleepwalkers*, the first ancient civilizations—the Babylonians, Egyptians and Hebrews—conceived of their universe as an oyster surrounded by water.

The Babylonian sky was a solid dome through which moisture sometimes seeped as rain, Koestler writes, while the waters below burst to the surface in the form of natural springs, and each day the sun, moon and stars performed a slow, ritual dance across its ceiling, entering from the east and exiting to the west.

As for the ancient Egyptian universe, it was more rectangular and box-like. At first, they conceived of their sky as a cow, one foot planted squarely at each corner of the Earth, or alternatively as a woman resting on her hands and knees. Later, they likened it to a vaulted metal lid. The sun and moon gods, they believed, sailed along a river that flowed upon an elevated gallery around the box's inner walls.

Early Greek cosmology followed similar concepts: Homer's world resembles a floating disk surrounded by Oceanus—the great mythical river, that encircled the world. But as time unfolded, the tremendous advances made by the ancient Greeks in figuring out how the universe is structured propelled them to become the driving force behind the development of Western astronomy and science.

### **Heliocentric versus geocentric**

Considered one of the greatest astronomers of antiquity, Aristarchus of Samos (310 B.C. to 230 B.C.) was responsible for the earliest-known heliocentric theory of the solar system, placing the sun at the center of the known universe, with the Earth revolving around the sun once a year and rotating about its axis once a day. Describing the sun as the "central fire" of the cosmos, he succeeded in correctly mapping all the then-known planets in order of distance around it.

Unfortunately for Aristarchus and the evolution of astronomical knowledge, Aristotle and most of the ancient Greek thinkers rejected his heliocentric theory. Instead, the Earth-centered model of the universe developed by Claudius Ptolemy of Alexandria in A.D. 140 prevailed, dominating Western thinking for nearly 1,400 years until it was finally toppled in the 16th century by Renaissance astronomer and polymath Nicolaus Copernicus.

Apart from its longevity, Ptolemy's geocentric model frankly didn't have much going for it, being not only incorrect but also mind-bogglingly complex. Indeed, it was so convoluted that, after having it explained to him, Alfonso X, the 13th-century King of Castile, was famously reported to have remarked, "If the Lord Almighty had consulted me before embarking upon Creation, I should have recommended something simpler."

### **Getting it right—sometimes**

While Hipparchus of Nicaea (190 B.C. to 120 B.C.) is credited with discovering and measuring the Earth's precession and the compilation of the first comprehensive star catalog of the Western world, Aristarchus made the earliest-known attempted calculations of the relative sizes of the sun and the moon and their distances from Earth.

He reasoned that the sun, Earth and moon would form a right-angled triangle when the moon is in its first or third quarter. Using the theorem developed a few centuries earlier by Pythagoras—the earliest proponent of the then-radical idea that the Earth was round—Aristarchus calculated (wrongly, it turns out) that the distance from Earth to the sun was between 18 and 20 times the distance to the moon. (The actual ratio is 389:1.) Based on careful timing of lunar eclipses, he also estimated that the size of the moon was approximately one-third that of Earth. There he was surprisingly accurate—the moon's diameter measures 0.27 times that of the Earth.

The Greeks even came close to correctly calculating Earth's circumference, thanks to Eratosthenes (276 B.C. to 195 B.C.), chief librarian at the Great Library of Alexandria in Egypt. Aristarchus had shown that the sun is sufficiently far from Earth that its rays are effectively parallel by the time they reach us. Eratosthenes used varying lengths of shadows, cast by poles stuck vertically into the ground at different latitudes and measured at midday on the summer solstice, to estimate the Earth's circumference as approximately 250,000 stades.

"As the length of stadia varied regionally, the exact length of the unit used by Eratosthenes is uncertain. But his estimate fell within a range of error of roughly 1% to 17% of today's accepted value of 24,901 miles—still an impressive achievement," Herchenroeder says.

### **Using science to overcome superstition**

This deep fascination with the ability to make astronomical calculations is manifested in the Antikythera mechanism, Herchenroeder notes.

"The mechanism's focus on predicting celestial motion demonstrates awareness of the possibilities of demystifying knowledge of the cosmos many regarded as divine in nature, and hence beyond the normal scope of human understanding," he says. "We have interesting accounts of prediction of lunar eclipses, for example—one of the things this object presumably was able to do."

One such account relates how on the eve of the Battle of Pydna between Rome and Macedon in 168 B.C., both armies were rattled by a lunar eclipse, considering it a bad omen. Cicero recounts how a Roman officer familiar with astronomy explained that an eclipse is a natural event, not a sign of divine disfavor, thus dispelling "empty superstition and fear." The Romans went on to win the battle—a major milestone in their conquest of the Aegean world.

### **Finding meaning in the stars**

Many other ancient civilizations also developed sophisticated systems for observing and interpreting the cosmos, using this knowledge to enhance their lives.

Ancient Polynesians learned to use the stars to navigate thousands of miles across the Pacific Ocean, enabling them to colonize distant islands, including the Hawaiian Islands.

The ancient Egyptians carefully tracked the rising time of the bright star Sirius, whose yearly cycle corresponded with the flooding of the River Nile which they relied upon to sustain their crops.

Ancient European megalithic sites aligned to solstices and equinoxes and going back to

Neolithic societies stretch up the Atlantic Coast. Two of the best known, Stonehenge in England and Newgrange in Ireland, were already ancient when the pyramids were built and were the largest human-made structures anywhere in the world.

Tok Thompson, professor (teaching) of anthropology at USC Dornsife, disagrees with speculation that megalithic sites like Stonehenge were giant observatories, built so that ancient civilizations could figure out the movements and cycles of the planets, the sun and the moon.

"These monuments were ritual enactments, monumentalizing what they already knew," he says.

They also helped societies keep track of time.

"Before there were widespread calendars to connect people, how do you keep a civilization together?" Thompson asks. "Having large festival gatherings at these ritualistically important spots that were anchored in the cosmos, which probably gave them sacred meaning, was one way to do this. It allowed people to memorialize their culture and—most importantly—gave them a place in the cosmos.

"Why am I here? What happens when I die?" Our focus on the stars has societal implications, but I think it also has personal implications. It's about giving our lives meaning."

### **The Venus detectives**

Probably the best-known of the classical civilizations of Mesoamerica, the Maya developed a sophisticated calendar based on their astronomical observations.

"Indigenous people all across the Americas were incredible observers of their universe. They had a very astute understanding of natural processes and the world, the movement of time, stars and calendrics," says Eric Heller, lecturer in anthropology at USC Dornsife and an expert on Maya cosmology and ideology.

The Maya may have originated on the Pacific Coasts of what are today southern Mexico and Guatemala, as well as the Yucatán, around 2600 B.C. and rose to prominence between 200 B.C. and A.D. 900. The Maya cosmos consisted of three distinct realms, Heller explains.



Beneath their feet lay the underworld, Xibalba, a dark and watery place. Above them were the 13 levels of the upper world, the realm of celestial bodies—gods and deceased ancestors responsible for the operation of the universe.

In between, the terrestrial realm was divided into four corners, roughly corresponding to our cardinal directions and marked by the movement of the sun across the horizon throughout the year, from solstice to equinox and back again.

While the Maya, like many ancient peoples, lived their lives in accordance with the cycles and rhythms of the universe, they also placed tremendous emphasis on the correlation between time and space, believing that the purpose of humanity was to count the days of creation and maintain the sacred calendars of the cycles of time.

A navigational chart from the Marshall Islands made of wood, sennit fiber and cowrie shells. Credit: Jim Heaphy

The most outstanding evidence for this is the 11th- or 12th-century Dresden Codex. Opening accordion-style to extend 12 feet, its pages are tightly packed with Maya hieroglyphs recording accurate astronomical tables thought to be based on thousands of years of observational knowledge.

"The Maya tracked Venus, which has an incredibly complex motion across the horizon, over generations so they could predict when it would appear in the sky because they considered it a dangerous omen that could herald war, illness or death," Heller says.

The Codex also contains remarkably accurate tables enabling solar eclipses across Earth to be predicted within a three-day window, and indefinitely into the future. In 1991, two noted Maya scholars, Harvey and Victoria Bricker, used the Dresden Codex to predict a solar eclipse to the day—at least 800 years after the tables were compiled.

### **An animist view**

Most American Indigenous cultures understood their world from the perspective of animism, and the Maya were no exception. Looking up, they saw a world of stars, planets and clouds that lived and moved through the sky and were manifestations of their ancestors, who they believed were playing a major role in the operation of their universe.

"These civilizations felt a connection between stars, the sun and the moon, the clouds in the sky," Heller says. "Everything they saw around them, even the things they touched and used every day, they felt kinship with on some level—something often lost in our modern, post-Enlightenment world."

Heller acknowledges that the Maya's unique way of knowing and representing the world appears strange to us. But in fact, he argues, when we dig deep to unpack and understand these metaphorical representations of natural processes and the cosmos itself, we find a tremendous amount of knowledge.

"It's expressed in radically different ontology but in fact it's the product of deep observational knowledge—the kind of stuff that we might think of as quite scientific in a sense," he says.

One example is the ancient Mesoamerican metaphor for the Earth: a crocodile floating upon a watery underworld whose breath, flowing in and out of cave mouths, brought rain.

"At first glance, I think a lot of people would say, "Well, the Earth's not a crocodile; this doesn't make sense," Heller says. "But, in fact, there's a tremendous amount of water beneath Mesoamerica. And the Earth-crocodile's exhalations bringing rain essentially describes changes in barometric pressure and the arrival of rain-bringing weather systems."

### **Measuring up**

So, how does the Maya's knowledge about the universe measure up to our own?

"The Maya got a tremendous amount right about what was around them," Heller says. "They understood how their universe worked, and they had a tremendously effective set of metaphors for expressing the operation of the world processes that dictated in many ways the successes and failures of their lives."

Cavan Concannon, associate professor of religion, agrees, noting that ancient peoples developed ways of navigating their place in the universe with what they had available to them.

"I think in some ways they were also writing themselves into the story of the cosmos. Part of knowing your place is also knowing who you are and why you are in a universe the way it is," Concannon says.

"And so, I'm not certain that it's a question of whether they got it right or wrong. Contemporary science is, itself, a constantly evolving conversation and at some point, everything that we thought we knew about the universe is going to change. The ancients made their way through the universe in a way that made sense to them and lived their lives in that context. I think we're still doing that."

**Please visit the site: <https://phys.org/news/2022-03-ancient-civilizations-cosmos.html>  
[Go there for pix]**

## **ROMAN BOAT THAT SANK IN MEDITERRANEAN 1,700 YEARS AGO GIVES UP ITS TREASURES**

Finds from fourth-century wreck ‘perfectly preserved’ just 2m below the surface off one of Mallorca’s busiest beaches

One squally day or stormy night about 1,700 years ago, a boat carrying hundreds of amphorae of wine, olives, oil and garum – the fermented fish sauce that so delighted the ancient palate – came to grief during a stopover in Mallorca.

The merchant vessel, probably at anchor in the Bay of Palma while en route from south-west Spain to Italy, was quickly swallowed by the waves and buried in the sands of the shallow seabed.

Doomed ship of gold’s ghostly picture gallery is plucked from the seabed [Read more](#)

Until last month, its miraculously preserved treasures had lain untouched, despite sitting just 2 metres beneath the bellies of the countless tourists who swim off one of the busiest beaches in the Balearics.

Now, however, the boat – known as the Ses Fontanelles wreck – is giving up its archaeological, historical and gastronomic secrets. A recovery operation overseen by the island’s governing body, the Consell de Mallorca, and involving experts from three Spanish universities in the Balearics, Barcelona and Cádiz, has retrieved about 300 amphorae as well as other objects that offer priceless insights into the Mediterranean of the fourth century AD and the crew’s daily lives.

In addition to the clay jars – which still bear their painted inscriptions or tituli picti – archaeologists have found a leather shoe, a rope shoe, a cooking pot, an oil lamp and only the fourth Roman carpenter’s drill recovered from the region.

Divers at the Ses Fontanelles wreck site, 50 metres off one of Mallorca’s busiest beaches. Photograph: Jose A Moya/Arqueomallornauta - Consell de Mallorca, Universitat de Barcelona, Universidad de Cádiz, Universitat de les Illes Balears

The boat, which is 12 metres long and between 5 and 6 metres wide, emerged three years ago after a summer storm churned up the waters of the bay. Its appearance confirmed anecdotal reports from divers dating back to the 1950s, and prompted the Consell de Mallorca to take action.

After running an emergency intervention, the consell put together a team of archaeologists and marine experts to undertake the three-year Arqueomallornauta project.

“The aim is to preserve everything there and all the information it contains, and that couldn’t be done in a single emergency intervention,” says Jaume Cardell, the consell’s head of archaeology.

“That’s where the project Arqueomallornauta comes in: it’s about recovering and preserving both the wreck and its historical cargo.

This isn’t just about Mallorca; in the whole western Mediterranean, there are very few wrecks with such a singular cargo.”

Although the team is now looking at how best to recover the hull of the wreck, which lies just 50 metres off the beach, those who brought up the cargo in an operation that ran from November 2021 to mid-February are still a little breathless over what they have found.

None of the team had expected the sands of the bay to have done such a spectacular job of sealing the wreck off from oxygen and preserving its organic materials.

“Things have been so perfectly preserved that we have found bits of textile, a leather shoe and an espadrille,” says Dr Miguel Ángel Cau, an archaeologist at the University of Barcelona.

Archaeologists say the merchant vessel’s cargo has been miraculously preserved. Photograph: Jose A Moya/Arqueomallornauta - Consell de Mallorca, Universitat de Barcelona, Universidad de Cádiz, Universitat de les Illes Balears

“The most surprising thing about the boat is just how well preserved it is – even the wood of the hull ... It’s wood that you can knock – like it’s from yesterday.”

The team, who established that the boat set sail from Spain’s Cartagena region by analysing the minerals in the amphorae’s clay, say it is hard to overstate the significance of the find.

“It’s important in terms of naval architecture because there are very few ancient boats that are as well preserved as this one,” says Dr Darío Bernal-Casasola, an archaeologist at the University of Cádiz.

“There are no complete Roman boats in Spain.”

What’s more, he adds, the amphorae represent an improbable subaquatic archaeological hat-trick: “It’s incredibly difficult – almost impossible – to find whole amphorae that bear inscriptions, and also still have the remains of their contents. The state of conservation here is just amazing. And you have got all this in just 2 metres of water where millions of people have swum.”

For Enrique García Riaza, a historian at the University of the Balearic Islands, the wreck highlights the commercial and strategic importance of the Balearic archipelago during the Roman empire.

“The islands weren’t cut off – on the contrary, they were a fundamental staging post on routes from the Iberian peninsula and the Italic peninsula,” he says. “In Roman times, the cities of the Balearic archipelago had political elites who were also very well connected to the main Roman cities of the Mediterranean coast, such as Cartagena and Tarragona.”

The team has found no trace of the boat's crew apart from their belongings, suggesting perhaps they made it to the shore or were swept away from the wreck by the waves. What they left behind, however, is intriguing.

The 12 metre-long boat was discovered after a summer storm three years ago disturbed the sea bed. Photograph: Arqueomallornauta - Consell de Mallorca, Universitat de Barcelona, Universidad de Cádiz, Universitat de les Illes Balears Advertisement

Cau points to the oil lamp, which bears an obviously pagan symbol of the moon goddess Diana, and to the Christian signs that appear on the seals of some of the amphorae.

“The crew were probably pagan, but some of the merchandise they were carrying has Christian symbols,” he says. “You have to be careful about how you interpret that – that cargo could have been from an ecclesiastical authority – but you have that coexistence between the pagan and the Christian.

“That may tell us a bit about the daily lives for the crew. They might have said, ‘Look, I’m a sailor and I believe what I believe, but if you want me to carry a Christian cargo, I’m OK with that if the money’s good.’”

With the recovery phase complete and the cataloguing under way, thoughts are now turning to putting the entire find on show.

“The idea is to recover the hull, and we are in touch with both national and international experts to make sure it’s properly recovered,” says Cardell.

“The boat needs to be exhibited and people need to see it. At the end of the day, we do archaeology for everyone and not just for the scientists.”

A few weeks after the wreck's cargo was touched by human hands for the first time in almost two millennia, the archaeologists remain buoyant.

“This is one of those finds when you are just laughing all the time because you can't believe it,” says Cau. “This is the sort of thing that happens to you once in an academic lifetime. We will never find anything like this again and that's what makes it so special.”

**Please visit the site: <https://www.theguardian.com/science/2022/mar/08/roman-boat-that-sank-in-mediterranean-1700-years-ago-gives-up-its-treasures> [Go there for pix]**

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## **AI COULD DECIPHER GAPS IN ANCIENT GREEK TEXTS, SAY RESEARCHERS**

From imperial decrees to Sappho’s poems, Ithaca system can find word patterns and suggest age of text

Artificial intelligence could bring to life lost texts, from imperial decrees to the poems of Sappho, researchers have revealed, after developing a system that can fill in the gaps in ancient Greek inscriptions and pinpoint when and where they are from.

Dr Thea Sommerschild, a co-author of the research at Ca’ Foscari University of Venice and Harvard University, said inscriptions were important as they were written directly by ancient people and were evidence of the thought, language, society and history of past civilisations.

“But most surviving inscriptions have been damaged over the centuries. So their texts are now fragmentary or illegible,” she said, adding that they may also have been moved from their original location, while methods such as radiocarbon dating were unusable on materials such as stone.

Writing in the journal Nature, Sommerschild and colleagues report how they built an AI system that they nicknamed Ithaca, after the Greek island that was home to the legendary King Odysseus.

The team fed Ithaca more than 63,000 transcribed ancient Greek inscriptions, enabling it to pick out patterns in the order of letters and words, as well as associations between words and phrases and the age and provenance of the text.

The team then tuned the system before exploring whether it could accurately suggest when and where another 7,811 inscriptions were from, and propose a selection of letters and words to fill in artificially created gaps in the inscriptions, ranked by probability.

Ancient Greek writing chiselled on stone. Photograph: Getty Images/iStockphoto

The results reveal that Ithaca achieved 62% accuracy when used alone to fill in the gaps in inscriptions, and 72% accuracy when the system’s suggestions were interpreted by a historian – about three times higher than when historians worked alone. The team said Ithaca was able to date the inscriptions to within 30 years of their established date and correctly identified their provenance 71% of the time.

“Just as microscopes and telescopes have extended the range of what scientists can do today, Ithaca aims to singularly augment and expand the capabilities to study one of the most significant periods of human history,” said Dr Yannis Assael, a co-author of the work from the AI company DeepMind.

The team said the approach could be used for any medium and any ancient written language, from Latin to Cuneiform, and it might be possible to train the system on Greek literary texts written on fragments of papyrus – an approach that could shed light on the

writings of poets such as Sappho. There is also the potential to develop AI systems that could provide insights into the authorship of texts.

### **Advertisement**

The researchers said Ithaca had already been used on a set of decrees most of which were found on the Acropolis of Athens, suggesting one – relating to the collection of tributes across the Athenian empire – dated to 424BC rather than 448-7BC as was long thought, chiming with recent dating breakthroughs.

“Although it might seem like a small difference, this 30-year shift has momentous repercussions for our understanding of the political history of classical Athens, and helps us better align literary sources – such as Thucydides’ account of these years and events – with the epigraphic record,” said Sommerschild.

Prof Peter Liddel, an expert in Greek history and epigraphy at the University of Manchester who was not involved in the research, said even the provenance of many of the marbles brought back by Lord Elgin was unclear.

“The application of AI through Ithaca certainly has the potential to contribute to the toolbox of historians involved in analysing ancient texts and using them to understand processes like the development of imperialism or the nature of cult activity,” he said.

However, Liddel warned that, like scholars, AI was limited by gaps in the ancient record. “AI is only powerful as a tool to help us ask questions about, and make comparisons to, the existing evidence,” he said.

Prof Melissa Terras, an expert in digital cultural heritage at the University of Edinburgh, said it was important to keep training scholars in traditional approaches to be able to develop AI systems such as Ithaca, and to interpret the suggestions they generate. But she said there was huge potential for AI to assist with interpretation of the past and its cultures given ancient texts were often fragmented yet followed structured formats.

“This means they require a lot of cross-referencing for the human brain to solve the puzzle – but this is the type of repetitive calculation that [AI systems such as] deep neural nets excel at,” she said.

**Please visit the site: <https://www.theguardian.com/science/2022/mar/09/ai-could-decipher-gaps-in-ancient-greek-texts-say-researchers> [Go there for pix]**

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## **ROME'S NEW MUSEUM DEDICATED TO COOKING, BY RONAN O'CONNELL**

From the outside, the museum on Palatine Hill looked like just another of Rome's elegant palazzi, its entrance graced with statues of Roman soldiers and decorative urns.

Inside, however, it was clear that this wasn't your run-of-the-mill Roman mansion. Hundreds of culinary tools were displayed in glass cabinets: bulky 19th-Century pasta machines, 220-year-old Italian bowls once used by Italian monks and well-worn steel pots designed for making osso bucco, the classic northern Italian veal recipe. What at first looked like medieval plates of armour were in fact metal tray moulds up to 500 years old. Some were for baking, others for making chocolate or ice cream.

Other displays held books. I stopped in front of one illustration to look at lumps of meat cooked over an open flame on a 16th-Century rotisserie; in the picture next to it, Italian men sat at a banquet table, eating. These sketches decorate the cover of one of the oldest cookbooks displayed in the museum, *Il Trinciante*, written in 1593 by Vincenzo Cervio. The author was a trinciante, or carver, for Italian Cardinal Alessandro Farnese. Cervio's 74-chapter opus reveals how to precisely cut fish, pies, fruits and vegetables and, above all, meat and fowl like pork, chicken, turkey, pheasant and peacock. Detailed drawings specify Cervio's preferred carving points to ensure juicy and flavourful cuts.

*Il Trinciante* is one of 120 cookbooks at the Museo della Cucina, a museum opening in May 2022 that will be the city's first focusing on the history of food and cooking. Since the first mass-printed cookbook was published almost 550 years ago, many Italian recipes have been all but lost, hibernating in old texts hidden in repositories, said the museum's director, Matteo Ghirighini. The Museo della Cucina aims to rectify that. Its collection is based on that of Italian chef Rosso Boscolo and includes many of the oldest and rarest cookbooks in existence – including some originally meant only for popes. Boscolo's Tuscan cooking school Campus Etoile Academy, meanwhile, will help the museum grow rare ingredients and perfect neglected recipes once reserved only for royalty.

When I got a sneak peek at the museum in November 2021, it was preparing for its launch. I came across it by accident. Rome is so awash with extraordinary sites that it's easy to overlook monumental churches and remains of 2,000-year-old palaces, let alone a yet-to-open cooking museum.

But already the Museo della Cucina had been included on Google Maps. And as I used my phone's GPS, I noticed its listing. What initially piqued my interest was its remarkable location. The museum is wedged between two of Rome's most important historic sites – the 2,600-year-old stadium Circus Maximus, and Palatine Hill, where Rome was founded and which is cloaked in the remains of ancient palaces and temples.

As it turns out, the museum isn't just on the Palatine but on the specific location where Romulus and Remus, the legendary founders of Rome, were breastfed by the Roman wolf goddess Lupa more than 2,700 years ago. Myth has it that Romulus later established Rome on the same spot.



It is fitting the museum sits on such a historic location, said Ghirighini. "Cooking as a way of reading contemporary history has often been underrated," he said. "Cooking is a product of its time and it can tell us a lot about customs, ways of thinking, specific economic and political situations. So, a cookbook is often much more than it seems."

These sentiments were shared by Laila Tentoni, president of Italy's renowned Casa Artusi centre for gastronomy in Forlimpopoli, northern Italy. She said Italy's food revealed an enormous amount about the country's passions. And cookbooks, in turn, had greatly shaped the history and direction of Italian cuisine.

Casa Artusi is dedicated to one of the country's most revered cookbook authors, Pellegrino Artusi. Tentoni said Artusi's 1891 book, *Science in the Kitchen and the Art of Eating Well*, aimed to demystify Italian cuisine that had previously been reserved for the country's elite.

"Artusi was like the first food blogger," Tentoni said. "Artusi suggests to be simple, to use local, seasonal and quality products.

Always you must choose the finest ingredients as your raw materials, for these will make you shine, Artusi wrote."

I admired a rare first edition of Artusi's influential text on the second floor of the Museo della Cucina. While Artusi's cookbook is not as vibrantly illustrated as some others, it makes up for that with his colourful writing style. "Many people will read this recipe and cry out: 'Oh what a ridiculous pasta!'," he wrote about his curious Lentin Spaghetti, in an English language version of his publication I read online. Made from ground walnuts, breadcrumbs, confectioner's sugar and allspice – also known as Jamaican pepper or pimento – this sweet spaghetti was unfailingly popular with children, Artusi said.

Some of Artusi's recipes have since fallen out of favour – such as his recipe for eel pie. Not only is that long, slender fish difficult to prepare and cook – so much so that Japan has many specialist eel chefs – but Artusi's recipe pairs it with raisins, rosewater and almond milk.

Dozens of old cooking utensils are displayed at the Museo della Cucina  
(Credit: Ronan O'Connell)

Having long ago forgotten my high school Italian, I was unable to decipher the open pages of the library's books. But Ghirighini told me I could eventually read each one in English once the museum's comprehensive website is completed. "Basically, you have access to a full virtual, illustrated, guided tour through five centuries of gastronomy," he said.

From among that trove he singled out several texts I should examine. In addition to Artusi's classic, there was the first cookbook ever mass printed, *On Honourable Pleasure and Health*, by Italian author Bartolomeo Platina in 1474. That text, which focused on the preparation of single meals rather than decadent banquets, earned a huge following in Italy before its popularity saw it translated into French and German.

A similarly important cookbook, Ghirighini said, was *The Opera of Bartolomeo Scappi* from 1570. That was written by and named after the revered Scappi, the private chef of Pope Pius V. This cookbook, which brims with sketches of meals being prepared in grand kitchens, was extraordinary because, for the first time, it gave the Italian public access to recipes previously untasted outside of the Vatican.

In particular, Scappi wrote of how Pope Pius IV was a fan of frog. Not just any frog, mind you, but those from the city of Bologna, which were especially plump and delicious. For the Pope, Scappi would remove the frogs' surprisingly large livers, coat them in egg, flour and milk and then fry them into crispy fritters. That was a snack.

The remainder of this amphibian was prepared as a heartier meal for His Holiness. Scappi would discard the head and the tips of the frog's feet, and fry what was left only in flour. Then he'd soak it in verjuice sauce made from unripened grapes, which was once a popular ingredient among Italian chefs but has largely been superseded by vinegar.

Because French cuisine had significant influences on northern Italian gastronomy – due to sharing both a border and mutual admiration for each other's continent-leading culinary prowess – the museum also displays many of France's finest cookbooks, written by the likes of Marie-Antoine Careme, Francois Massialot and Urbane Francois Dubois.

"The books in the museum contain the first printed recipes of all the most iconic dishes of the gastronomic culture of [Italy and France], from tomato sauce to supplì (rice croquettes) and panettone, from macarons to meringues," Ghirighini said.

As the owner of a sweet tooth, my mouth watered as I admired evocative drawings of towering cakes in Careme's book *Le Patissier Royal Parisien*. He pioneered a grandiose approach to cooking that leaned on spectacle as much as technique. From pastry, sugar and marzipan, Careme created giant replicas of famous buildings.

Aside from books and artefacts, Ghirighini said the museum plans to bring historical dishes alive with tastings, such as the first-ever recipe for Italian tomato sauce, from the late 1600s. Taken from Antonio Latini's 1692 cookbook, this recipe has more in common with spicy salsa than the mild tomato sauce of the modern day thanks to its generous helping of fresh chillies.

There will also be on-site banquets featuring ancient recipes from the museum's cookbooks, some of which have been dormant for generations, although Ghirighini did not yet want to reveal yet what they may be.

"A cookbook and food museum in Rome is absolutely something new," said Flaminia Belloni, a Rome tour guide for 20 years. "It's a good chance to learn how the food and the cooking traditions were a real part of the lifestyle and state of mind for all Italians."

Ghirighini hopes others will agree. After all, few feats could be more difficult than attempting to crystallise, within one building, more than 500 years of Italian cooking – and doing justice to one of the most globally renowned, and fascinating, aspects of Italian culture.

Please visit the site: <https://www.bbc.com/travel/article/20220307-romes-new-museum-dedicated-to-cooking> [Go there for pix]

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## **EXPERIMENTS SHOW WHY EARLY HUMANS BEGAN ADDING HANDLES TO TOOLS, BY BOB YIRKA**

A team of researchers at the University of Liverpool has tested the assumption that hafted tools (those with handles) provided early humans with enough benefit to warrant their construction and use. In their paper published in *Journal of the Royal Society Interface*, the group describes how they enlisted the assistance of several volunteers to help them learn more about the types of benefits to be gained from hafted tools.

For many years, the wheel has been named as the most important invention humans have ever come up with due to the major impact it had on the development of so many early activities such as industry, transport and agriculture. In this new effort, the researchers suggest the invention of hafted tools might have been equally important. By adding a handle to tools, humans stabilized their existence—handled tools made cutting down trees much easier, which led to the development of wooden structures. They also made hunting more efficient by making it a lot easier to sharpen spears. In this new effort, the researchers noted that little work has been done to learn more about the advantages given to early humans by hafted tools. And that led them to conduct tests of their own.

The work by the researchers entailed enlisting the assistance of 24 male and 16 female adult volunteers to conduct early human type activities using both hafted and unhafted tools—each was fitted with a suit holding sensors that measured motion, muscle contractions, oxygen consumption and the speed at which tools were moving through the air.

The volunteers were asked to attempt to chop down a simulated tree using axes with and without handles and to try to scrape away fibers on a carpet that simulated an animal hide using scrapers with and without handles.

In looking at the data from the tests, the researchers found that the hafted tools allowed for a greater range of motion, the use of more muscle and a greater impact speed, which resulted in more force. And while use of the hafted tools required much more exertion, the payoff more than outweighed the cost. The researchers conclude by suggesting that their tests showed that the benefits obtained from hafted tools almost certainly contributed to their invention and spread in early civilizations.

Please visit the site: <https://phys.org/news/2022-03-early-humans-began-adding-tools.html> [Go there for pix] [Scholarly article at <https://royalsocietypublishing.org/doi/10.1098/rsif.2021.0660>]

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## **ANCIENT STATUE FROM 4TH MILLENNIUM BCE ON DISPLAY FOR FIRST TIME, BY JUDITH SUDILOVSKY**

The unique life-sized “The Lord of the Desert” stone stele was discovered during the taking of inventory at the Israel Museum in Jerusalem

Long stashed-away unknowingly in the Israel Museum’s storage rooms, a unique carved stele from the early 4th millennium BCE went on special display on March 8 at the museum.

The imposing stele – a standing relief made of a stone slab carved with figurative images – is unique not only because of its life-like size: it stands 1.74 meters high (5.7 feet) and weighs 350 kgs. (771 lbs.), but also because of its extremely well-preserved condition despite having been broken into two pieces.

Dubbed “The Lord of the Desert,” the stele was discovered in 2017 while taking inventory of the Iron Age storage area where it had been incorrectly stored since its arrival soon after the museum’s founding in 1965.

After a laborious five-year process of restoration directed by Laura A. Peri, curator of Western Asiatic Antiquities at the museum, the stele has now been put on display for the first time.

“We don’t know anything about this specific stele or how it got to the museum. We just know it was in the museum for a long time, since its founding,” Peri said. “It was a very difficult and complicated mission to restore it and put up the exhibit because it is very heavy and does not have a base so it is not stable.”

The stele depicts a bearded man wearing a band around his head, reminiscent of the agal, or cord, which holds the keffiyeh in place, and a long necklace. Three parallel cords with a long implement through them cross his chest and back. A double-bladed dagger attached to a belt hangs from his waist.

“We are really speaking of a very early and impressive, one-of-a-kind object and it is finally available for viewing by the public,” Peri said. “There is no other object like this in the world. The figurative carved images are exceptional and it is monumental in size. When they carved him they carved him on all sides and emphasized the eyes and mouth, the long necklace and the belt with the dagger.”

Dancers performing the traditional Ardah dance in Saudi Arabia and Yemen today wear this attire, including several objects depicted on the stele such as the dagger – called a jambiya, an agal, and a leather ammunition belt, Peri said.

“It is really amazing,” she said.

According to Peri's initial research, the stele's origin appears to be from the north Arabian Desert or south Jordan, Peri said.

Another similar but shorter stele of a bearded man which was found in El-Maakir-Qaryat al-kaafa near Ha'il, Saudi Arabia, is on exhibit at National Museum in Riyadh, Saudi Arabia, but is only one meter high (3.2 feet). The stele is broken and originally may have been as tall as the stele at the Israel Museum, Peri said.

"We want to continue the research and analyze the stone of our stele to try and determine where it came from exactly," she added.

Other steles like this have been discovered from south Jordan to Yemen but most of these are either broken or the carvings are not so well preserved, Peri said. Steles have been found alone or in groups near burial sites or sanctuaries.

They may have represented gods, ancestors, or individuals of high social status and been used as a gravestone or played a role in rituals, she said. Because no written text from that period is available to substantiate any theories of their purpose, scholars can only guess based on later traditions, she added.

In later civilizations, steles were used to emphasize boundaries by kings declaring their conquest over land, or they were placed in temples as images of god, she said.

Interestingly, Peri said, similar steles from the same period have also been found ranging from the Iberian Peninsula to the Caucasus, and though they are not full anthropomorphic figures, they do have similar details such as the dagger and a face of a bearded man.

"The dagger was a very important element," she said.

The Lord of the Desert stele is now on display opposite another stele from the second half of the 8th century BCE of the founder of the Assyrian Empire, King Tiglath-Pileser III, which has an inscription paying tribute to Menachem, son of Gadi, King of Israel.

Please visit the site: <https://www.jpost.com/archaeology/article-701335> [Go there for pix]

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## **COLLECTORS IN THE PREHISTORIC WORLD RECYCLED OLD STONE TOOLS TO PRESERVE THE MEMORY OF THEIR ANCESTORS, BY TEL-AVIV UNIVERSITY**

A first-of-its-kind study at Tel Aviv University asks what drove prehistoric humans to collect and recycle flint tools that had been made, used, and discarded by their predecessors. After examining flint tools from one layer at the 500,000-year-old prehistoric site of Revadim in the south of Israel's Coastal Plain, the researchers propose a novel explanation: prehistoric humans, just like us, were collectors by nature and culture. The study suggests that they had an emotional urge to collect old human-made artifacts, mostly as a means for preserving the memory of their ancestors and maintaining their connectedness with place and time.

The study was led by Ph.D. student Bar Efrati and Prof. Ran Barkai of the Jacob M. Alkow Department of Archaeology and Ancient Near Eastern Cultures at TAU's Entin Faculty of Humanities, in collaboration with Dr. Flavia Venditti from the University of Tübingen in Germany and Prof. Stella Nunziante Cesaro from the Sapienza University of Rome, Italy. The paper appeared in the prestigious scientific journal *Scientific Reports*, published by Nature.

Bar Efrati explains that stone tools with two lifecycles have been found at prehistoric sites all over the world, but the phenomenon has never been thoroughly investigated. In the current study the researchers focused on a specific layer at Revadim—a large, open-air, multi-layered site in the south of Israel's Coastal Plain, dated to about 500,000 years ago. The rich findings at Revadim suggest that this was a popular spot in the prehistoric landscape, revisited over and over again by early humans drawn by an abundance of wildlife, including elephants. Moreover, the area is rich with good-quality flint, and most tools found at Revadim were in fact made of fresh flint.

Bar Efrati: "The big question is: Why did they do it? Why did prehistoric humans collect and recycle actual tools originally produced, used, and discarded by their predecessors, many years earlier? Scarcity of raw materials was clearly not the reason at Revadim, where good-quality flint is easy to come by. Nor was the motivation merely functional, since the recycled tools were neither unusual in form nor uniquely suitable for any specific use."

The key to identifying the recycled tools and understanding their history is the patina—a chemical coating which forms on flint when it is exposed to the elements for a long period of time. Thus, a discarded flint tool that lay on the ground for decades or centuries accumulated an easily identifiable layer of patina, which is different in both color and texture from the scars of a second cycle of processing that exposed the original color and texture of flint.

In the current study, 49 flint tools with two lifecycles were examined. Produced and used in their first lifecycle, these tools were abandoned, and years later, after accumulating a layer of patina, they were collected, reworked, and used again. The individuals who

recycled each tool removed the patina, exposing fresh flint, and shaped a new active edge. Both edges, the old and the new, were examined by the researchers under two kinds of microscopes, and via various chemical analyses, in search of use-wear marks and/or organic residues. In the case of 28 tools, use-wear marks were found on the old and/or new edges, and in 13 tools, organic residues were detected, evidence of contact with animal bones or fat.

(Left to Right): Prof. Ran Barkai & Bar Efrati. Credit: Tel Aviv University Recycled patinated flint tool from Revadim. The yellow-orange areas are the old patinated surfaces of the item, while the new minimal modifications created a new edge that expose the fresh color of the flint. In the case of this items one can see that the morphology, surfaces, and colors of the original item are almost fully preserved, while the recycled modification is minimal and specific. Credit: Tel Aviv University Close-up on the new active edge of four flint tools from Revadim. One can see the differences in colors and texture between the new modified edges and the outer patinated, old, surfaces. Credit: Tel Aviv University (Left to Right): Prof. Ran Barkai & Bar Efrati. Credit: Tel Aviv University Recycled patinated flint tool from Revadim. The yellow-orange areas are the old patinated surfaces of the item, while the new minimal modifications created a new edge that expose the fresh color of the flint. In the case of this items one can see that the morphology, surfaces, and colors of the original item are almost fully preserved, while the recycled modification is minimal and specific. Credit: Tel Aviv University

Surprisingly, the tools had been used for very different purposes in their two lifecycles—the older edges primarily for cutting, and the newer edges for scraping (processing soft materials like leather and bone). Another baffling discovery: in their second lifecycle the tools were reshaped in a very specific and minimal manner, preserving the original form of the tool, including its patina, and only slightly modifying the active edge.

Prof. Ran Barkai: "Based on our findings, we propose that prehistoric humans collected and recycled old tools because they attached significance to items made by their predecessors. Imagine a prehistoric human walking through the landscape 500,000 years ago, when an old stone tool catches his eye. The tool means something to him—it carries the memory of his ancestors or evokes a connection to a certain place. He picks it up and weighs it in his hands. The artifact pleases him, so he decides to take it 'home.' Understanding that daily use can preserve and even enhance the memory, he retouches the edge for his own use, but takes care not to alter the overall shape—in honor of the first manufacturer.

In a modern analogy, the prehistoric human may be likened to a young farmer still plowing his fields with his great-grandfather's rusty old tractor, replacing parts now and then, but preserving the good old machine as is, because it symbolizes his family's bond with the land.

In fact, the more we study early humans, we learn to appreciate them, their intelligence, and their capabilities. Moreover, we discover that they were not so different from us. This study suggests that collectors and the urge to collect may be as old as humankind. Just like us, our early ancestors attached great importance to old artifacts, preserving them as significant memory objects—a bond with older worlds and important places in the landscape."



Please visit the site: <https://tinyurl.com/m2dwzvf8>

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## **HOLY SEPULCHRE CHURCH PAVEMENT RESTORATION ALLOWS FIRST-TIME EXCAVATION, BY JUDITH SUDILOVSKY**

Most of any remains found are likely to be then covered up in order to keep in accordance with the Status Quo.

An archaeological study of the floor under the Church of the Holy Sepulchre will be possible for the first time, after a two-year undertaking to repair and restore its pavement stones got underway in an inaugural ceremony on Monday.

This is the second phase of restoration work in the church following the restoration of the Edicule in 2016-2017, revered by Christians as the tomb of Jesus, which was directed by the Greek Orthodox Patriarchate and conducted by an interdisciplinary team from the National Technical University of Athens.

The current work is being conducted under the direction of the Custody of the Holy Land in cooperation with the Greek Orthodox Patriarchate and the Armenian Patriarchate, the three historical guardians of the Church, according to the 1852 Status Quo agreement that solidified the territorial division among the Christian communities in the church and other holy Christian sites.

“We don’t know what is beneath the floor,” said Prof. Giorgio Piras, director of the Department of Ancient Sciences at the Sapienza University of Rome, which will be responsible for the archaeological excavations of the entire floor area during the restoration of the pavement. “It has never been systematically excavated, so we don’t know what we shall find. But it should be at least some remains of [Roman Emperor] Constantine’s church.

“We hope to understand the structure of this very holy place. Maybe there will be some remains from Hadrian’s Temple.”

The pavement stones date from various periods ranging from the medieval period to last century, he said.

Father Eugenio Alliata, director of the Franciscan Terra Sancta Museum’s archaeological section, said most of the pavement stones appear to be from the early 19th century, other parts may be from the Crusader period, and a smaller section – especially in areas underneath the Church, such as the area called the Prison of Christ – may even be from the period of Constantine. Analysis of the stones will need to be done to confirm their age, he said.

All work will be conducted with the cooperation and coordination of the Christian communities, Piras said.

Most of the remains found will likely be covered up in accordance with the status quo, he said.

Franciscan Custos of the Holy Land Francesco Patton said the start of restoration work had been delayed by the outbreak of the COVID-19 pandemic. The cooperation of the three custodian churches has taken on greater significance with the war between Russia and Ukraine, he said, adding: “We see how important our cooperation is for faith and hope for all.”

The pavement stones are to be restored and repaired in sections, allowing for the normal flow of visitors to the church, and will be reused where possible, while those that are broken will be replaced with similar local stones, Patton said.

Daniela Russo, who will be leading the restoration team from the La Venaria Reale Conservation and Restoration Center in Torino, Italy, said: “The first challenge we will have is the historical stones we are working with.”

“I think we all have to face a lot of history,” she said. “We have to manage this and translate the history to the modern day and make it functional. We have to try to conserve the history as well as renew all of the apparatus while maintaining the status quo. We all have to work together.”

THE TEAMS will study the shape, weight and any markings of the stones and analyze any mortar found on the surface to compare it to any found underneath, Russo said.

As the floor pavements are removed, an archaeological excavation will be carried out in the exposed sections. The current restoration project is to include the design and construction of electrical, water, mechanical and special fire-fighting systems and any work needed to maintain the safety of the Edicule.

“The restoration of the floor will be an operation of [organizing] the jumble of pipes and drains, and it will be important to avoid humidity and improve the safety of the church,” said Prof. Roberto Zecchin, representing Manens-TIFS SpA of Padua, Italy, which will be responsible for infrastructure systems to be installed underneath the floor.

The Politecnico di Milano and IG Ingegneria Geotecnica of Turin will also be involved in the various phases of the restoration project.

Francesca Romana Stasolla, a professor of Christian and Medieval Archaeology at the Sapienza University in Rome, will be leading the archaeological excavations at the church. Following the analysis and study phase, the excavations will be carried out in a similar way to other excavation works in sections of the floor, despite the historical and religious significance of the church, she said.

“This is a very important historical work,” she added. “We will have to work day by day and see what we uncover. Technically, the work will be the same as in any excavation. We expect to see all the sequences of the church history to the Constantine church. But in every archaeological excavation there are surprises.”

According to tradition, up until the first century BCE, the area on which the church stands was a stone quarry, and traces of these activities are still clearly visible in the chapels below the current church, Stasolla said.

In this area, which was outside the city walls, the Christian Gospels identify the place of Golgotha – the traditional site of Jesus’s crucifixion. Between 41 and 44 CE, King Agrippa incorporated the area within the walls of the church.

A major restructuring took place under Roman Emperor Hadrian between 135 and 136 CE as he repressed an anti-Roman revolt by founding the city of Aelia Capitolina, with Christian sources mentioning the impressive temple of Capitoline Jupiter, which some scholars believe stood at the site of the basilica.

Constantine began construction on a church at the site in 326 CE, which was completed in 335 and included a series of religious buildings. He had a rotunda built with the revered excavated tomb in the center of the basilica. In 614, the basilica was burned by the Persians and, following a restoration, survived intact until 1009, when it was once again destroyed almost entirely by the Fatimid caliph of Cairo.

A few decades later in 1042, Byzantine Emperor Constantine Monomachus began work on reconstruction of the basilica, but with a very different, reduced layout than the original. With the establishment of the Crusader kingdom in 1099, additional works expanded and remodeled the church, which was consecrated in 1142. This is more or less the church that stands today.

The church sustained extensive damage caused by a major fire in 1808 and an earthquake in 1927. It took about 30 years for the three custodial Christian communities to reach an agreement on a major repair program.

**Please visit the site: <https://www.jpost.com/archaeology/article-701249> Go there for pix]**

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## **THE COLORED SKELETONS OF ÇATALHÖYÜK, TURKEY, FROM 9,000 YEARS AGO**

An international team with participation of the University of Bern provides new insights about how the inhabitants of the "oldest city in the world" in Çatalhöyük (Turkey) buried their dead. Their bones were partially painted, excavated several times and reburied. The findings provide insight into the burial rituals of a fascinating society that lived 9000 years ago.

Çatalhöyük (Central Anatolia, Turkey) is one of the most important archaeological sites in the Near East, with an occupation that dates back to 9000 years ago. This Neolithic settlement, known as the world's oldest city, covers an area of 13?ha and features densely aggregated mudbrick buildings. The houses of Çatalhöyük present the archaeological traces of ritual activities including intramural burials with some skeletons bearing traces of colorants, and wall paintings.

The association between the use of colorants and symbolic activities is documented among many past and present human societies. In the Near East, the use of pigments in architectural and funerary contexts becomes especially frequent starting from the second half of the 9th and the 8th millennium BC. Near Eastern archaeological sites dating back to the Neolithic have returned a large body of evidence of complex, often mysterious, symbolic activities. These include secondary funerary treatments, retrieval and circulation of skeletal parts, such as skulls, and the use of pigments in both architectural spaces and funerary contexts.

A study recently published in the journal *Scientific Reports* by an international research team with Bern participation provides the first analysis of the pigments use in funerary and architectural contexts from this essential Neolithic site. According to senior author of the study Marco Milella (Department of Physical Anthropology, Institute of Forensic Medicine, University of Bern): "These results reveal exciting insights about the association between the use of colorants, funerary rituals and living spaces in this fascinating society."

A time travel into a world of colors, houses, and dead Marco Milella was part of the anthropological team who excavated and studied the human remains from Çatalhöyük. His work involves trying to make ancient and modern skeletons "speak." Establishing the age and sex, investigating violent injuries or special treatment of the corpse, and solving skeletal puzzles are routine activities at the Department of Physical Anthropology.

The study shows that red ochre was most commonly used at Çatalhöyük, present on some adults of both sexes and children, and that cinnabar and blue/green were associated with males and females, respectively.

Intriguingly, the number of burials in a building appears associated with the number of subsequent layers of architectural paintings. This suggests a contextual association between funerary deposition and application of colorants in the domestic space. "This

means: when they buried someone, they also painted on the walls of the house," Milella says. Furthermore, at Çatalhöyük, some individuals "stayed" in the community: their skeletal elements were retrieved and circulated for some time, before they were buried again. This second burial of skeletal elements was also accompanied by wall paintings.

### Neolithic mysteries

Only a selection of individuals was buried with colourants, and only a part of the individuals remained in the community with their circulating bones. According to Marco Milella, "the criteria guiding the selection of these individuals escape our understanding for now, which makes these findings even more interesting. Our study shows that this selection was not related to age or sex." What is clear, however, is that visual expression, ritual performance and symbolic associations were elements of shared long-term socio-cultural practices in this Neolithic society.

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#### Journal Reference:

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#### Please visit the site:

<https://www.sciencedaily.com/releases/2022/03/220318110255.htm> [Go there for link to images]



## **A STUDY OF PREHISTORIC PAINTING HAS COME TO A STARTLING CONCLUSION: MANY ANCIENT ARTISTS WERE TINY CHILDREN, BY SARAH CASCONI**

Researchers also believe that the painted handprints contain coded signals.

Comparing hand measurement from a contemporary child and an ancient hand painting from a Spanish cave. Photo courtesy of Verónica Fernández-Navarro.

New research is shaking up our image of art-making in Paleolithic times, arguing that children or even toddlers may have been behind some of world's earliest known art. The findings suggest that ancient rock painting was actually a family-oriented group activity, not a solitary male pursuit.

For a study published in the Journal of Archaeological Science, researchers from Cambridge University and Spain's University of Cantabria examined 180 hand stencils painted in Spanish caves some 20,000 years ago. The study used 3-D models of hand paintings in Spain's El Castillo, Maltravieso, Fuente de Salín, Fuente del Trucho, and La Gama caves, created by the Handpas Project.

These prehistoric images would have been made by blowing pigments through a hollow reed or bone onto hands placed against the cave wall—a process that would have made the outlines slightly larger than the hands themselves.

Accounting for that difference, the researchers found that up 25 percent of the hand marks were not large enough to belong to adults or teenagers. They guessed that they came from children between two and 12 years of age, with the majority of those likely made by three to 10-year-olds.

A) The photogrammetry process of making measurements using photographs. B) Experimental hand stencil. C) Experimental hand stencil 3-D model. D) Modern sample of scanned hands. Photo courtesy of Verónica Fernández-Navarro.

“Many more children's hands came out than we expected,” lead author Verónica Fernández-Navarro told the Telegraph. “It would appear that artistic activity was not a closed activity closely linked to male individuals and the survival of the group, as had been thought until now.”

Because the smaller children would not have been able to blow the pigment hard enough to create the markings, we can safely assume that their parents or other adults were helping them. Painting could have been an important communal activity for Paleolithic peoples.

Fernández-Navarro is now working to further analyze the hand markings to determine if the gestures made in some images carry any meaning. She suspects that bent

fingers in some of the hand silhouettes, which seem to appear in recurring patterns, could have been used as a form of non-verbal language.

“We want to find out if it is a code that they knew how to interpret, in the same way that we today interpret a ‘stop’ sign,” she added.

Children also believed to be responsible for what could be the world’s oldest art, a set of ancient hand and foot prints found in Tibet last year that were made between 169,000 and 226,000 years ago.

**Please visit the site: <https://news.artnet.com/art-world/children-worlds-first-artists-new-study-finds-quarter-prehistoric-spanish-hand-paintings-kids-13-2084734> [Go there for pix]**

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## **HOW KING SOLOMON AND THE ROMANS SHAPED THE JUDEAN DATE PALM, BY RUTH SCHUSTER**

The famed Judean dates began as one variant 2,400 years ago, by the Common Era had become something else and today, are different again.

"And they came to Elim, where were twelve springs of water, and three score and ten palm trees; and they encamped there by the waters." – Exodus 15:27

"They" were the Israelites fleeing Egypt, led by Moses, according to the biblical account. The palm is the date palm and it is mentioned time and again in the Bible. In addition, numerous references to the luscious Judean date appear in historical records from the classical period. The second-century geographer Pausanias for example extols its virtues compared with the Ionian one.

The question is, which date exactly was so revered? The date palms growing in Israel today aren't the same as the ones in biblical and classical times. Those died out hundreds of years ago, though possibly an isolated few still survive in and around Jericho in the West Bank.

But following the germination of roughly 2,000-year-old date seeds and subsequent genetic analysis of the seedlings by Israeli researchers, we know a lot more about the extinct varieties that once flourished in ancient Judea.

The date palm species *Phoenix dactylifera* has scores of variants that produce fruit distinguished by color, size, flavor and aroma, from the gooey medjool to the less-syrupy zahidi and the midnight hayani.

Aficionados sound like sommeliers as they extol the fruit's shimmer, textures and/or whispers of caramel.

### **The resurrection**

Date palms were apparently domesticated around 7,000 to 8,000 years ago in the Persian Gulf and Mesopotamia, present-day Iraq. They may have been one of the earliest fruits to be domesticated, commensurately with the olive.

From Arabia, date domestication spread westward and by at least 3,500 years ago had reached Egypt, whence it spread to Libya and the Sahel.

The original wild date was smaller, with seeds about a centimeter long. In the course of domestication, the best plants were selected to breed and the fruit became bigger. By the time of the Second Temple, which began around 500 B.C.E., dates were deeply entrenched in Judean cuisine and culture.

“And there were made on them, on the doors of the temple, cherubim and palm-trees, like as were made upon the walls.” – Ezekiel 41:25

Dates grew in plantations around Jericho along the Dead Sea and in the Jordan Valley, and were exported around the Mediterranean. They were extolled by classical writers like Strabo, Tacitus and Pliny, not to mention Pausanias who thought the Ionian dates positively revolting; they were given as gifts by King Herod to the Roman emperor, says Sarah Sallon, director of the Natural Medicine Research Center at Hadassah Medical Center. She initiated, planned and wrote up the studies.

“Pliny mentions the large size of these Judean dates,” Sallon says.

“Six of them were a cubit in length; i.e., stretching from the elbow to the tip of the third finger.”

In the last decade, Sallon and Elaine Solowey of the Arava Institute for Environmental Studies at Kibbutz Ketura germinated date seeds that were radiocarbon-dated to between 1,800 and 2,400 years old. The seeds had been discovered by archaeologists at sites in the Judean Desert, including Masada. Seven trees grew.

The seven trees were named, from the oldest seed to the youngest: Methuselah, Hannah, Adam, Judith, Boaz, Jonah and Uriel. And lo, genetic analyses Sallon and international teams published in Science Advances in 2020, and in a 2021 paper in the journal PNAS by Muriel Gros-Balthazard and colleagues, show that these seven trees aren't all the same type.

The changes in the genetic makeup of these germinated date palms show that Judean farmers used sophisticated agricultural practices and benefited from different varieties acquired from as far away as Arabia, Babylon and North Africa. The hybrid date variants were a product of their own diaspora and long-distance trade from the Iron Age right up to the Roman period, Sallon suggests.

By the way, how does the fruit of Hannah, one of the female resurrected dates, taste? Like zahidi dates, says Haaretz correspondent Nir Hasson. “Drier and sweeter than the medjool with a taste like natural honey.”

### **King Solomon's trading routes**

Before dwelling on the varieties of ancient Judean dates, what about the palms thriving in Israel today? Cultivated date palms in modern Israel were mostly brought from North Africa or Iraq in the 1950s.

“By the 19th century, there were only a few date palms around Jericho and the Dead Sea, producing mostly small dates that visitors at that time wrote were fit only for animals,” Sallon says.

Which brings us back to the resurrected specimens. Methuselah and Hannah grew from the oldest seeds, dating some time between the first to fourth century B.C.E. They are closer to eastern varieties of date palm, which grow today from Arabia to Pakistan, Sallon explains.

Methuselah was similar to modern varieties that are found in Arabia, while Hannah is more like modern Iraqi varieties.

“By the time of King Solomon [the 10th century B.C.E.] there was trade between ancient Israel and Arabia, which had already been domesticating palm trees for 4,000 years,” Sallon says. “Perhaps at that time some of their high-producing cultivars were introduced or possibly were even growing here naturally.”

Adam and Judith are 2,000 to 2,200 years old. Boaz may be as young as the mid-first century C.E., and Jonah and Uriel date from about the first or second centuries. These younger palms are more similar to varieties that grow today in North Africa and may reflect Roman trade around the Mediterranean at that time, Sallon says.

As for Hannah and Judith, both are more like modern Iraqi varieties of date palms. “We know from the Talmud that the Jews worked in date plantations during their 70-year exile to Babylon,” Sallon says.

“It’s possible that on their return to Eretz Israel, they brought back with them female offshoots that are true clones of the mother, a high-producing female tree. When planted, these offshoots would then grow into another super-breeder identical to their mother.”

Genome analysis of the ancient date family at NYU by Gros-Balthazard and Prof. Michael Purugganan has shown something else as well. Modern dates today are actually a hybrid of two species of palms, the date palm (*Phoenix dactylifera*) and the Cretan palm (*Phoenix theophrastus*).

This mixing probably happened in the very distant past, and modern dates still show a trace of the Cretan palm in their genome.

Interestingly though, the ancient Judean date palms show significantly more of the Cretan palm than modern dates, and the older they are (Methuselah, Hannah, Adam), the more they have of these genes.

Thus dates growing in the land that is today Israel profoundly changed, starting from tiny things discovered many years ago during excavations at Jericho, possibly wild or in the process of domestication, to the luscious fruit fit for kings by Herod’s time, incorporating elements from Arabia, Mesopotamia and North Africa.

### **A wild date**

Are no wild dates left in the Middle East? There might be. A paper in October 2021 by Gros-Balthazard and colleagues discusses the discovery of wild ancestors of the date palm in remote mountains in Oman.

The Omani wild trees are genetically diverse, as befits a true ancestral population, and have rounded seeds that do resemble a close sister species as well as archaeological samples, but not modern cultivars, the scientists write.

It bears adding that these trees do not hold a record for growing from the most ancient seeds. A Russian team reportedly grew a flower, of *Silene stenophylla*, from a 32,000 year old seed found in deep permafrost, it was reported a decade ago.

Back to the resurrected Judean dates. What are the future plans for them?

“Well, we want to grow them in large quantities using tissue culture and reestablish them in commercial plantations,” Sallon answers. “If successful, in a few years, Judean dates may again be a major export of this country ... as they were 2,000 years ago.”

Aside from her research into these fascinating dates, Sallon is also keen to have her children’s book “The Dates’ Tale” published (it will be in English). “It’s Methuselah’s story from his point of view,” she says. “It’s also about nature’s extraordinary resilience: how seeds so old could be brought back to life. It’s a beacon of hope in these difficult times.”

**Please visit the site: <https://www.haaretz.com/archaeology/how-king-solomon-and-the-romans-shaped-the-judean-date-palm-1.10685653> [Go there for pix]**

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## **ATHENS TOWER OF THE WINDS IS WORLD'S OLDEST METEOROLOGICAL STATION, BY PHILIP CHRYSOPOULOS**

The Tower of the Winds in Athens is the oldest meteorological station in the world, and one of the most important ancient monuments in Greece.

Standing just below the Acropolis, in the middle of the ancient Roman Agora, the Tower of the Winds was built in the 1st century BC. It is also called Αέριδες (Aerides) by the Greeks, meaning winds.

It is a beautiful-looking octagonal tower, standing 13.5 meters (44.3 feet) high with a diameter of about 8 meters (26 feet), and is made of the well-known Pentelic marble.

The Tower of the Winds is classified as belonging to the Corinthian style (from the capitals) while its interior is in the Doric style (heavy structure)

To this day, the exact reason for its construction and placement in the particular point in the Roman Agora, is not known exactly.

What is known from testimonies of the time is that the Tower of the Winds was designed by astronomer Andronicus of Cyrrhus, ancient Macedonia.

A clock tower and meteorological station Research indicates that the height of the structure, the sundials, the wind-vane and its placement at the specific point in the Roman Agora make it an early example of a clocktower.

However, archaeologists believe it is probably a clock tower and a kind of meteorological station as well, probably used by merchants to calculate the time and the prevailing winds that affected the trade routes through which their merchandise would arrive.

At the top of the roof of the Tower of the Winds there was a brass wind-vane in the form of a Triton, which rotated to indicate the direction of one of the eight main winds.

Specifically, the frieze depicts the eight wind deities: Boreas (N), Kaikias (NE), Apeliotes (E), Eurus (SE), Notus (S), Lips (SW), Zephyrus (W), and Skiron (NW) and there are eight sundials.

In the interior, time was measured by a water clock, driven by water coming down from the Acropolis through a pipe. Researchers believe that the height of the tower was such that the sundials and the wind-vane would be visible on the Agora

Please visit the site: <https://greekreporter.com/2022/03/30/tower-winds-oldest-meteorological-station/> [Go there for pict]

## **ANCIENT ART AND GENETICS REVEALS SAFFRON CROCUS WAS FIRST DOMESTICATED IN BRONZE AGE GREECE**

Saffron, the world's most expensive spice, is extracted from the flowers of the saffron crocus, *Crocus sativus*.

It has been grown for thousands of years in the Mediterranean region.

But when and where was saffron first domesticated by our ancestors? In a review in *Frontiers in Plant Science*, researchers conclude that lines of evidence from ancient art and genetics converge on the same region.

“Both ancient artworks and genetics point to Bronze Age Greece, in approximately 1700 BCE or earlier, as the origin of saffron's domestication,” said Ludwig Mann, one of the leading authors and a PhD student at Technische Universität Dresden, Germany.

The genus *Crocus*, with approximately 250 species, ranges from South and Central Europe and North Africa to Western China. Unlike domesticated saffron, these species reproduce sexually in the wild.

The first known use by humans of wild crocuses was as pigment for cave paintings, approximately 50000 years ago in today's Iraq. Ancient texts from Sumer, Assyria, and Babylonia also describe the use of wild crocuses in medicine and dye.

In contrast, domesticated saffron doesn't grow in the wild, and can only be propagated asexually with human help, by dividing its underground ‘corms’—stem-like storage organs. The process was first described by the Greek philosopher Theophrastus in the fourth to third century BCE. Today, domesticated saffron is grown around the globe, for use in cooking and perfumes and as a yellow dye. Between 15000 and 16000 flowers, requiring between 370 and 470 person-hours to collect, yield a single kilo, worth between \$1300 and \$10000.

“Finding out where and when saffron was first domesticated isn't straightforward: the species is difficult to study genetically, because it has three copies of every chromosome instead of the usual two, and a large genome containing a high percentage of difficult-to-sequence repetitive DNA,” said leading author Seyyedeh-Sanam Kazemi-Shahandashti, a PhD student at the Institute of Bio- and Geosciences of the Forschungszentrum Jülich, Germany.

“As there are no ancient crocus remains preserved from ancient times, we here revisit ancient artworks that depict saffron-like plants. We expected that these could point us to specific regions.”

The authors argue that artworks from the Minoan civilization of ancient Greece are likely the oldest to depict domesticated saffron.

For example, the dense patches of crocus flowers on the fresco ‘The Saffron Gatherers’ from the island of Santorini (approximately 1600 BCE) suggest cultivation. Another fresco on the same island, ‘The Adorants’, shows flowers with long, dark-red stigmas which overtop dark violet petals, typical of domesticated saffron. Flowers with these traits are also depicted on ceramics and cloth from Bronze Age Greece, and symbolically rendered in the ideogram for saffron in the ancient Linear B script. In Egypt, tombs from the 15th and 14th centuries BCE depict how ambassadors from Crete brought tribute in the form of textiles dyed with saffron.

An origin in Bronze Age Greece agrees with results from genetic studies from 2019, which showed that *C. cartwrightianus*, which only occurs in mainland Greece and Crete, is saffron’s closest wild relative.

The authors believe that the modern saffron crocus with its three genomes arose naturally from the wild, either exclusively from *C. cartwrightianus* or from hybrids between *C. cartwrightianus* and another crocus species. The saffron crocus would then have been retained by the Bronze Age Greeks because of its superior qualities as a spice.

The authors will continue to trace saffron’s properties, said final author Dr Tony Heitkam, leader of the Plant Genomics group at Technische Universität Dresden: “Around the globe today, all saffron crocuses are effectively clones dating back to saffron’s emergence in ancient Greece. Nevertheless, despite sharing the same genome, saffron can have different properties depending on the region. We have started to investigate the molecular causes, in particular so-called ‘epigenetic’ differences, for this regional variation.”

Please visit the site: <https://www.heritagedaily.com/2022/03/ancient-art-and-genetics-reveals-saffron-crocus-was-first-domesticated-in-bronze-age-greece/143248?amp>

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## **JERUSALEM ELITE ENJOYED WINE WITH TOUCHES OF VANILLA IN KINGDOM OF JUDAH, BY JUDITH SUDILOVSKY**

Researchers were recently surprised to discover organic residues of the exotic, expensive (even until today) spice on wine jars unearthed during excavations in the City of David.

Modern-day wine lovers are not the only ones who enjoy a few vanilla notes in their luxury wines.

Researchers from Tel Aviv University and the Antiquities Authority (IAA) were recently surprised to discover organic residues of the exotic, expensive (even until today) spice on wine jars unearthed during excavations in the City of David National Park, located in Jerusalem's Silwan neighborhood.

They say the discovery indicates that the wine was enriched with vanilla, and “fantastically” illustrates which luxury products arrived to Jerusalem, possibly from India and its environs, thanks to its strategic location along the international trade route.

The process of “oaking” – the aging of wines in barrels made from oak – which has been around since Roman times imparts an understated vanilla note to wine due to the vanillin chemical compound found in oak. However, the Israeli researchers say their analysis of the residue found three different molecules, which together indicate a fingerprint from vanilla itself, leaving no doubt of the origins of the residue.

Their study, recently published in the scientific journal Plos One, describes the results of chemical tests that identified the remnants of these molecules, which have been preserved in the tiny spaces on the side of the pottery vessels.

“Vanilla markers are an unusual find, especially in light of the fire that occurred in the buildings where the jars were found,” said Ayala Amir, a doctoral student in the Department of Archeology and Ancient Near Eastern Cultures at Tel Aviv University. “The results of the analysis of the organic residues allow me to say with confidence that the jars contained wine and that it was seasoned with vanilla.”

IAA director Eli Eskozido noted that new scientific tools continue to contribute information to the archaeological studies of the past.

The discovery of vanilla is apparently related to an international trade route that crossed the Negev during the seventh century BCE, initially under the auspices of the Assyrian Empire and later likely under their heirs, the Egyptians, and possibly even the Babylonians, according to the researchers.

The wine jars, dating to the days of King Zedekiah – the end of the glory days of the Kingdom of Judah – were discovered inside storage rooms of buildings in two different archaeological excavations in the City of David. The two buildings unearthed in the excavations were destroyed during the Babylonian obliteration of Jerusalem in 586 BCE.



The jars were discovered smashed inside the rooms, under a collapsed building.

One excavation, conducted by the IAA, is located on the eastern slopes of the City of David hill. Another excavation, under the joint management of the IAA and Tel Aviv University, was conducted in the Givati Parking Lot, west of the hill.

The study examined eight jars from both buildings, and clear evidence was found in all of them for wine storage, according to the IAA.

The finds, including the vanilla used in the wine, indicate that the elites connected to the administrative seat of the Kingdom of Judah living in the neighborhoods of the area were enjoying the good life, according to Dr. Yiftah Shalev.

Shalev's excavation, together with Prof. Yuval Gadot in the Givati Parking Lot, revealed a set of more than 15 jars in a ground floor easternmost room that might have been a wine cellar in an impressive two-story building. The archaeologists believe the building might have served as a bureau of senior officials in the kingdom.

Other vessels for storing liquids, including a very large one, were also found in the room that was so crowded that researchers said it would have been very hard for people to move around inside it.

“These finds tell us that the residents of Jerusalem in the late seventh century BCE in this area were people of means, with money, who were connected to international trade and the South Arabia trade,”

Shalev said. “They could allow themselves the prestigious things of life that were available then, and were connected to the trends of the day. I don't know what the wine tasted like then, but it certainly was considered high quality at the time.”

Social events and ceremonies that included drinking wine were also common then in many other cultures in Greece and Eastern empires. It is mentioned numerous times in the Bible, such as in Psalms 104:15, where God is blessed as the creator of “wine, which cheers man's heart,” and in Amos 6:1-7, as the Prophet Amos rebukes “the complacent in Zion... You lie on beds adorned with ivory and lounge on your couches... You drink wine by the bowlful.”

Seal impressions in the shape of a rosette appear on the handles of some of the jars, indicating that they and their contents were part of the royal administration of the Kingdom of Judah, the researchers said, and that the number of jars and impressions on them point to the economic importance of wine, and the drinking culture, as a tool for expressing status and power.

“These jars were part of the taxation system common throughout Judea in the seventh century BCE,” said Shalev.

**Please visit the site: <https://www.jpost.com/archaeology/article-702646> [Go there for pix]**

## **SHIPWRECK OFF ISRAELI COAST** **CHANGES WHAT WE KNOW ABOUT THE** **EARLY ISLAMIC PERIOD, BY ARIEL DAVID**

Goods from all over, including Turkish nuts in Egyptian jars, found in ship that sank off Ma'agan Michael in northern Israel 1,400 years ago belie 'dark Age' after the Muslim conquest of the Levant

In 2005, two amateur divers from Ma'agan Michael, a kibbutz on Israel's northern coast, spotted old timber, pottery fragments and ballast stones at the bottom of the Mediterranean Sea. They did alert the authorities, but the sea quickly covered the remains with sand again, and the shipwreck was lost.

Happily, it was rediscovered a decade later by researchers from the University of Haifa, who realized that it's a 1,400-year-old wreck of a merchantman from the early Islamic period. Labeled the "Ma'agan Michael B ship," this large, well-preserved vessel is one of the major discoveries in maritime archaeology in years, and may change the perception of a period thought of as a dark age, marked only by war and international isolation.

"We have very few shipwrecks from this period and they are mostly smaller, coastal vessels," says Deborah Cvikel, a professor of nautical archaeology at the University of Haifa who leads the underwater excavation. "Here we have a large, nicely built merchantman that could brave the open seas, and that's one of the things that make it unique."

The Ma'agan Michael B ship, or MMB for short, should not be confused with another ancient vessel that was raised from the sea-bottom in front of this same kibbutz in the 1980s. This more famous Ma'agan Michael ship (without the "B") is smaller and much older, dating to the fifth century B.C.E., the Persian period.

The MMB, instead, dates to between 648 and 740 C.E., the century that immediately followed the Muslim conquest of the Levant and the establishment of the Islamic Caliphate. Evidence collected from the wreck over seven years of underwater excavations indicate that the ship transported goods between Christian- and Muslim-controlled territories, and was manned by a multicultural crew, Cvikel says.

This challenges the traditional view of the early Islamic period as an era of little contact between Mediterranean regions, with activity in the sea consisting mainly of naval conflict between the Muslims and the Byzantine Empire, says Sierra Harding, a PhD candidate who studies animal bones found in marine digs.

By the sixth century, the Western Roman Empire had long fallen. Meanwhile, even before the Muslim expansion into the Middle East and North Africa, these regions were being ravaged by a plague pandemic, climate change and a brutal war between the Byzantine and Persian empires.

Couple that with the paucity of written records and of major shipwrecks from the period, and researchers have generally assumed that once the Muslims prevailed in the 7th century, overseas maritime trade pretty much ground to a halt, Harding says.

Yet the MMB ship belies that, as the 25-meter-long vessel carried at least 200 amphorae laden with produce including walnuts, olives, dates, figs and garum (an ancient Roman fermented fish sauce), Cvikel and team reported in a 2020 study.

The cargo must have come from different areas: for example, the garum contained bones of fish from the Sea of Galilee, while the walnuts were probably native of colder climes, such as the mountainous areas of Turkey or Syria.

The ship also transported baskets of freshwater mollusks from the Nile and caged wild birds that migrate through the northern Sinai.

The clay amphorae used to store the produce are also a mixed bag, with stylistic and chemical analysis suggesting they came from different spots, including Egypt, southern Palestine and Cyprus.

“Interestingly, we found walnuts in an Egyptian amphora, but you don’t have walnuts in Egypt, so what traveled where?” Cvikel wonders. “Did the walnuts come from Turkey to Egypt and then were loaded into this amphora or did the amphora travel from Egypt to Turkey? It’s one of the things we are still trying to figure out.”

Another interesting aspect of the cargo is that the MMB was carrying a shipment of glass fragments: broken off pieces of artifacts, jewelry, but also raw blobs of glass and other waste products of this industry.

Aside from two bottles, which were found in a different part of the ship and may have been used by the crew, the archaeologists were unable to reconstruct any artifacts from these hundreds of shards.

This suggests that the glass cargo was already in pieces when it boarded the ship and was probably destined for recycling at a workshop in the region, Cvikel and colleagues concluded in a 2021 study.

Chemically, the fragments came from Egypt and Palestine, and we know that during the Roman and Byzantine periods these were both important glass-making areas. The discovery of this regional trade in scrap glass shows that the industry was still doing brisk business in the early Islamic period, Cvikel says.

### **Telltale rats**

We don’t really know where the MMB ship came from or where it was going when it sank. Conservatively, Cvikel says it may have been sailing a triangular route between Egypt, Cyprus and somewhere in the Levant.

However, the ship may have sailed even farther, Harding suggests.

Buried in the bowels of the vessel, divers found the remains of six rats, and at least two of them belonged to variants typical of central Mediterranean islands, such as Corsica or

Sardinia, she says. This could indicate that the ship sailed to those lands too. Alternatively the ship could have picked up this particular infestation in any port, from other vessels that had gone to the central Mediterranean.

“In both cases, we see that during this time we have plague and we have war and yet we still have shipping and cargo connecting the central Mediterranean and the southern Levant, and that starts to open up our idea about the level of communication that was happening,” Harding says. (On a side note, the rat corpses were found deeply embedded in the MMB’s structure, suggesting they may have already been dead when the vessel sank, thus preserving the veracity of the old adage about these rodents leaving a sinking ship).

The ship itself was a costly project. It was constructed using shipbuilding techniques that were advanced for the time, and made using fir and walnut wood, a strange choice because the latter is particularly expensive, Cvikel says.

“Was she built in a place where those trees grow together or was the wood imported from different places?” she says. “We don’t know this yet, but certainly a lot of investment was put into this ship.”

A clue as to where the MMB was built may come from the study of a layer of resin that was laid to protect the timber from rot. Similarly to insects trapped in amber (tree resin that fossilized) millions of years ago, this sticky layer attracted and trapped bugs while it was still wet. Experts are studying the insects to try to figure out where their natural environment was, and by extension, where the ship was built.

The fact that foodstuffs, rat skeletons, bugs embedded in resin, as well as the bones of sheep and goats that were eaten by the crew have all been found aboard gives you an idea of how perfectly preserved the vessel is, possibly because it was covered by sand very quickly after it sank.

As for the sinking itself, it probably occurred in late fall or early winter, based on the seasonality of the fresh fruits found aboard, the archaeologists hypothesize.

The ship was probably not heading for Ma’agan Michael but may have been aiming for the ancient port of Tel Dor, just 5 nautical miles (10 kilometers) to the north. Because both locations have a chain of four small islands in front of them, the MMB crew may have confused the two spots, possibly because of bad weather, and run aground in the shallow waters in front of Ma’agan Michael, Cvikel says.

No bodies have been found in the wreck, suggesting that the sailors aboard may have safely reached the shore, she says.

### **Allah protect us**

This however does not mean that we can say nothing about the crew, which the archaeologists estimate would have numbered around eight people. Clues to their identity have been left in the dozens of inscriptions painted or carved both on the amphorae of the cargo and the timbers of the ship itself. These writings include Greek and Arabic letters,

as well as Christian crosses and Muslim invocations, such as bismillah – “in the name of God.”

In some cases, crosses and Greek letters on amphorae mark them as containing produce from various monasteries, which were very important in the economy of the period; and that could apply here too. But the use of Christian symbols and Arabic invocations to Allah carved into the ship’s wood were likely a way to bless the vessel’s perilous journeys across the sea and protect the crew, the archaeologists suggest.

The mix of alphabets and religious symbols points not only to the somewhat surprising fact that several people aboard must have had some level of literacy but also to the likelihood that the ship was manned by a multicultural crew of Christians and Muslims, Harding says.

“One of the biggest takeaways from this shipwreck is that, in the past as in the present, normal people are more connected and united in working together than the history books would have you believe, based on geopolitical narratives of wars and battles,” she tells Haaretz.

“These are just regular people trying to make a living, selling things that they bought along the way.”

The archaeologists plan to continue investigating the shipwreck and believe it will yield many more discoveries about daily life in the early Islamic period. However, at this time, there are no plans to raise the ship from the sea because of its large size and lack of proper facilities to host the hull, Cvikel says.

Raising the ship would be “an immense project, that would probably take a lifetime.” So, for the moment, the secrets of this unique shipwreck will remain accessible only to maritime archaeologists, and the fish.

**Please visit the site: <https://www.haaretz.com/archaeology/MAGAZINE-shipwreck-changes-what-we-know-about-the-early-islamic-period-1.10708784> [Go there for pix]**