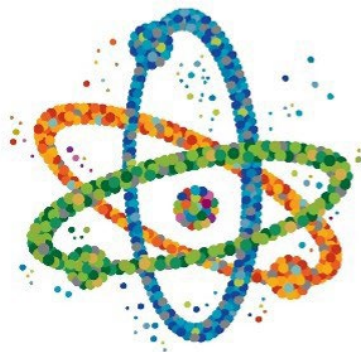


# IAEA Workshop on Innovative Approaches of Accelerator Science and Technology for Sustainable Heritage Management

13 - 16 June 2022

IAEA Headquarters, Vienna, Austria

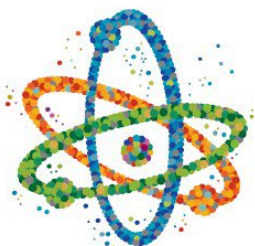


ATOMS  
FOR HERITAGE  

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IAEA

## Workshop Programme



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<https://nucleus.iaea.org/sites/accelerators/Pages/Accelerators4Heritage.aspx>

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## Monday, 13 June 2022

### Arrival - Board Room C (09:00 - 10:00)

### Opening of the Workshop - Board Room C (10:00 - 11:00)

#### Welcome Remarks

Ms Najat Mokhtar

IAEA Deputy Director General and Head of Department of Nuclear Sciences and Applications

#### IAEA activities

#### to support the utilization of nuclear techniques for Heritage Science

Ms Aliz Simon IAEA Accelerator Specialist, IAEA Physics Section

Ms Lena Bassel, IAEA Heritage Science Specialist, IAEA Physics Section

Mr Nuno Pessoa Barradas, Research Reactor Specialist, IAEA Physics Section

Mr BumSoo Han, Radiation Chemist, IAEA Radioisotope Products & Radiation Technology Section

#### Overview of the workshop structure, objectives and expected outcomes

#### Practicalities

Ms Aliz Simon, Accelerator Specialist, IAEA Physics Section

### Opening session - Board Room C (11:00 - 12:20)

#### Session Chair: Mr Ralf Kaiser, ICTP, Italy

11:00	[32] Advances, problems and potential for innovative accelerator science and technology approaches to sustainable Heritage Management in Cyprus, the Eastern Mediterranean and the Middle East (EMME)	LORENTZ, Kirsi (The Cyprus Institute), Cyprus
11:20	[70] AMS 14C dating of artifacts - prospects and challenges	HAJDAS, Irka (Laboratory of Ion Beam Physics), Switzerland
11:40	[1] Neutron techniques employed to study objects from the Wallace Collection	WILLIAMS, Alan (The Wallace Collection), United Kingdom
12:00	[2] Ionizing Radiation for Preservation: Uses of Electron-Beam Technology for Conservation of Photographic and Cinematographic Films	VASQUEZ, Pablo Antonio (Nuclear and Energy Research Institute – IPEN/CNEN/SP), Brazil

### Lunch Break and Posters (12:20 - 14:00)

## Interpretation, presentation and dissemination of the scientific results

### Case studies and success stories

**Board Room C (14:00 - 17:10)**

**Session Chair: Mr Manfred Schreiner, Academy of Fine Arts, Austria**

14:00 V	[94] Success stories on the characterization of Cultural Heritage in Latin America: dating of the Mayan Codex of Mexico and determination of arsenic in Chilean mummies	FUERTE, Cecilia (CONICET-INN), Argentina
14:20 V	[39] A non-invasive protocol based on Ion Beam Analysis for the study of lapis lazuli provenance in antiquity	MAGALINI, Marta (Università degli Studi di Torino), Italy
14:40 V	[41] Unravelling the past of glazed beads using accelerator-based techniques	CORREGIDOR, Victoria (C2TN- IST), Portugal
15:00	[48] Neutron tomography and gamma spectroscopy applied to bronze sculptures: a non-destructive and safe analysis	LI, Yueer (TU Delft), Netherlands

### Break (15:20-15:50)

15:50	[3] Probing Beneath the Surface without a Scratch: Using Muonic X-ray for Depth Sensitive Elemental Analysis on Roman Coinage	HILLIER, Adrian (ISIS Neutron and Muon Facility), United Kingdom
16:10	[18] Thin layers characterization with negative muons: a case study of gilded bronzes	CATALDO, Matteo (Università degli studi di Milano Bicocca), Italy
16:30	[34] Comparison of ATR-FTIR and O-PTIR techniques for characterization of a degraded oil paint cross-section	BANAS, Agnieszka (Singapore Synchrotron Light Source), Singapore
16:50	[78] Synchrotron-based techniques to study calcite crystals covering ornated cave walls	BASSEL, Lena (International Atomic Energy Agency), Austria

End of Day 1

"V"- virtual attendance

## Tuesday, 14 June 2022

### Special session for contributions from TC Africa

Board Room C (08:30 - 10:20)

Session Chair: Ms Polytimi Loukopoulou, Hellenic Ministry of Culture and Sports, Greece

08:30	Opening remarks Mr Shaukat ABDULRAZAK, Director TC Africa	
08:40	[66] Archaeometallurgical Study for a Set of Ancient Coins Excavated from Mediterranean Sea North of Egypt using Synchrotron Radiation Based XRD.	ATWA KHALIL, Dina (Grand Egyptian Museum Conservation Center), Egypt
09:00	[60] Eswatini's Shift Towards Sustainable Cultural and Natural Heritage Management	SIKHOSANA, Hlobile (Eswatini National Trust Commission), Eswatini
09:20 V	[53] Accelerator IBA Techniques for the study of ancient pottery from some Ghanaian archaeological sites	BOACHIE-ANSAH, James (University of Ghana), Ghana
09:40 V	[57] The application of accelerator-based analytical techniques to assess heavy metal contamination from legacy ASM and historic formal mine sites to produce contaminant status map and provide remediation options and for ASM environmental management in Ghana	AKABZAA, T.M (Department of Earth Science, University of Ghana), Ghana

### Poster flash presentations

10:00 V	[67] Characterization of Mineral Constituents of Archaeologically Recovered Ancient Pottery from Dixcove, Ghana using Ion Beam Analysis	BIVERIDGE, Fritz (University of Ghana), Ghana
10:02	[64] The effect of electron beam radiation on simulated fabrics used as a funeral shroud in Antiquity	DEGHIEDY, Noha (NCRRT), Egypt
10:04 V	[55] Characterisation of clay figurines from Koma Land of Ghana	NUVIADENU, Christian Kwasi (Ghana Atomic Energy Commission), Ghana
10:06	[54] Endangerments surrounding the tangible heritage in Sudan and the desired solutions through modern technologies	ALTAYIB, Mohammed Alfatih (Department of Archaeology - University of Khartoum), Sudan
10:08	[52] Radiation processing for cultural heritage preservation – Tunisian experience	KRAIEM, Mokhtar (CNSTN), Tunisia
10:10 V	[51] Employing technology in the protection of archaeological sites in Marib Governorate, Republic of Yemen	TUEAIMAN, ALI (General Organization for Antiquities and Museums), Yemen
10:12	[27] Application of Electron Beam Accelerator Technology for Treatment of Bio-threatened Cellulosic Artefacts	ABDELREHIM, Hassan (Atomic Energy Authority of Egypt), Egypt

**Break (10:20 - 10:50)****Special session for contributions from TC Asia-Pacific****Board Room C (10:50 - 14:20)****Session Chair: Ms Annette Ortiz Miranda, National Gallery of Denmark****Denmark**

10:50	Opening remarks TC Asia-Pacific Mr Massoud MALEK, PMO Asia-Pacific	
11:00	[40] Ion Beam analysis of Phoenician silver coins	EL MORR, Ziad (Lebanese Atomic Energy Commission – National Council for Scientific Research), Lebanon
11:20 V	[15] Characterization of pottery at Oc Eo, Vietnam by multivariate statistical and neutron activation analysis	TRAN, Quang Thien (Nuclear Research Institute), Vietnam
11:40 V	[31] Application of low energy X-rays for conservation and restoration of Nguyen dynasty woodblocks in Vietnam	NGUYEN, LINH (Dalat University), Vietnam
12:00	[17] Scientific approaches in characterization of Ayutthaya gold and gemstones artifacts	KHAWEERAT, Sasiphan (Nuclear Technology Research and Development Center, Thailand Institute of Nuclear Technology), Thailand

**Lunch Break and Posters (12:20 - 14:00)****Special session for contributions from TC Asia-Pacific continues**

14:00	[71] The Use of Nuclear Techniques for the Analysis of Archaeological Artefacts from The Early Bronze Age (3rd mill BC) Dahwa Site in Oman	AL-JAHWARI, Nasser Said (Sultan Qaboos University), Oman
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**Poster flash presentations**

14:20 V	[37] Low energy S- Band Linear Accelerator(s) for Radiography and Cargo Scanning as a tool for Cultural Heritage Management	ZEESHAN, Sumaira (Pakistan Atomic Energy Commission), Pakistan
14:22 V	[36] The future of accelerator technology application for archaeology in Indonesia	NOERWIDI, Sofwan (Research Center for Archaeometry, Indonesia), Indonesia
14:24	[23] LAEC investment in the use of IBA techniques to valorize cultural heritage	ROUMIE, Mohamad (Lebanese Atomic Energy Commission), Lebanon
14:26	[22] Accelerator Development Plan to Support National Research and Innovation Program	HIMAWAN, ROZIQ (National Nuclear Energy Agency of Indonesia (BATAN)) SUTRASNO, Sutrasno (Nuclear Energy Research Organization, BRIN), Indonesia

14:28 V	[5] Identifying key players in Heritage management in Bangladesh: Strategies for Capacity Buildup	MUMTAZ, Tabassum (Bangladesh Atomic Energy Commission), Bangladesh
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### Special Session for contributions from TC Europe Board

**Room C (14:30 - 15:30)**

**Session Chair: Ms Kirsi Lorentz, Cyprus Institute, Cyprus**

14:30	Opening remarks TC Europe Ms Tomo Furusawa, PMO TC Europe	
14:40	[50] Analysis of gold-leaf glass tesserae using micro-PIXE/PIGE	LOUKOPOULOU, Polytimi (Hellenic Ministry of Culture and Sports), Greece
15:00 V	[28] Study and restoration of icon "Dormition of the Mother of God"	VOKOPOLA, Gentian (National Institute for Cultural Heritage) ZGURO, Klejdi (National Institute for Cultural Heritage), Albania

### Poster flash presentations

15:20	[49] Development of Latvia Cultural Heritage research. Recent trends and impact achieved.	TUNA, Indra (Latvia National history museum), Latvia
15:22	[44] E-beam simulation for Cultural Heritage cellulosic materials preservation at IRASM	ALBOTA, Florin (HORIA HULUBEI NATIONAL INSTITUTE FOR R&D IN PHYSICS AND NUCLEAR ENGINEERING (IFIN-HH)), Romania
15:24	[20] Contribution to the Roman glass study: analyses performed by PIXE/PIGE, INAA and XRF	LESIGYARSKI, Deyan (National Institute of Geophysics, Geodesy and Geography - Bulgarian Academy of Sciences), Bulgaria

### Break and Posters (15:30 - 16:00)

**Special Session for contributions from TC Latin-America****Board Room C (16:00 - 18:20)****Session Chair: Mr Pablo Antonio VASQUEZ (Nuclear and Energy Research Institute – IPEN/CNEN/SP), Brazil**

16:00	Opening remarks TC Latin-America Mr Raul Ramirez Garcia, Section Head TC Latin-America	
16:10	[13] Applications of X-ray fluorescence in the research of the Chilean archaeological material culture. Case studies of the National Center for Conservation and Restoration.	LEIVA MIRANDA, Karla (Centro Nacional de Conservación y Restauración), Chile
16:30 V	[14] Analytical methodology for the study and diagnosis of the conservation status of archaeological objects	CANTARGI, Florencia (Laboratorio Argentino de Haces de Neutrones-CNEA), Argentina
16:50	[56] First gamma irradiation in the Colombian cultural heritage: the case of the artwork Mutantes of the National Museum of Colombia	GOMEZ URIBE, Ana Paula (Conservation and Collections Management Consultant – Museums Strengthening Program), Colombia
17:10	[29] Preservation and conservation of information contained in glassy materials from cultural collections with processing by ionizing radiation	NAGAI, Maria Luiza VASQUEZ SALVADOR, Pablo Antonio (Nuclear and Energy Research Institute – IPEN/CNEN/SP), Brazil
17:30	[11] Peruvian cultural heritage material characterization, achievements during the last twenty years	PETRICK, Susana (Universidad Nacional de Ingeniería - Lima, Peru), Peru
17:50	[30] Moving towards a sustainable conservation – Experience of the Museum of Archeology and Ethnology (MAE-USP)	DELGADO VIEIRA, Ana Carolina (IPEN - Instituto de Pesquisas Energéticas e Nucleares), Brazil

**Poster flash presentations**

18:10 V	[61] Irradiation of Cultural Heritage for Conservation: presentation of the Bolivian Multipurpose Irradiation Centre.	FERNANDEZ CALLE, Sara (Agencia Boliviana de Energía Nuclear ), Bolivia
18:12	[12] Diagnosis and proposal of treatment by gamma rays for documents with fungi in the National Archive of Chile	RÍOS, Natalia (Archivo Nacional de Chile), Chile
18:14 V	[10] Proposal for the application of neutron activation analysis of micro-samples of pigments in archaeological ceramics from the Argentine Northwest	PALAMARCZUK, Valeria (Instituto de las Culturas (IDECU) UBA-CONICET, Museo Etnográfico "Juan B. Ambrosetti"), Argentina
18:16 V	[9] 3D Printing and Photogrammetry in The Restoration and Conservation for an Historical Artefact	MORA, Rodrigo (Laboratorio Nacional de Nanotecnología (LANOTEC)), Costa Rica



18:18	[6] A sustainable approach to archaeometrical and conservation studies using nuclear techniques	MENDOZA CUEVAS, Ariadna (Colegio Universitario San Geronimo de la Habana, Oficina del Historiador de la ciudad de la Habana), Cuba
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End of Day 2

## Wednesday, 15 June 2022

### Detecting intellectual property crime as forgeries and fighting illicit trade of art objects with nuclear techniques

**Panel discussion - Board Room C (08:30 - 10:00)**

08:30	<p><b>Panel Coordinator:</b> Mr Bilal Nsouli, DG of the Lebanese Atomic Energy Commission</p> <p><b>Panel Members:</b> Ms Lena Bassel, IAEA Physics Section Ms Lucile Beck, LMC14 – Univ. Paris-Saclay, France Mr Lorenzo Giuntini, INFN, Italy Ms Irka Hajdas, Ion Beam Laboratory ETH Zurich, Switzerland Ms Claire Pacheco, C2RMF and New AGLAE, Palais du Louvre, France Ms Aliz Simon, IAEA Physics Section</p> <p>Introduction of the topic by the Panel members will be followed by Open discussion.</p>
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**Break (10:00 - 10:30)**

## Access to research infrastructure, and international as well as regional collaborations and networks

**Board Room C (10:30 - 13:10)**

**Session Chair: Mr Koen Janssens, (AXIS Research group, NANOlaboratory, University of Antwerp), Belgium**

**Centre of Excellence, University of Antwerp), Belgium**

10:30 V	[21] The Cultural Heritage Project at ANSTO	SALVEMINI, Filomena (ANSTO), Australia
10:50 V	[38] The IAEA Collaborating Center Atoms for Heritage at Université Paris-Saclay	BERTRAND, Loic (Université Paris-Saclay), France
11:10	[77] Heritage Science Austria. An Austrian national hub of infrastructures and resources for the tangible cultural heritage	D'ANNA, Maria Bianca (Austrian Academy of Sciences, Austrian Archaeological Institute), Austria
11:30	[89] NCRRT as Collaborating Centre in Industrial Radiation Processing and Cultural Heritage Preservation	ABDELREHIM, Hassan, NCRRT, Egypt
11:50 V	[79] Status of the MACHINA project, the Movable Accelerator for Cultural Heritage In-situ Non-destructive Analysis	GIUNTINI, Lorenzo (Istituto Nazionale di Fisica Nucleare), Italy
12:10	[72] IAEA activities to facilitate access to accelerators	MIGLIORI, Alessandro (International Atomic Energy Agency), Austria
12:30 V	[4] "Open SESAME for cultural heritage research and beyond"	KAMEL, Gihan (SESAME Light Source), Jordan
12:50 V	[65] The CARNAÚBA beamline of Sirius synchrotron light source - a platform for nanofocus studies	GALANTE, Douglas (Brazilian Center for Research in Energy and Materials), Brazil

**Lunch Break (13:10-14:00)**

## Safe analysis of heritage objects; Best practice and Irradiation Passport for Art Board Room C (14:00 - 15:10)

**Session Chair: Mr Roger Webb, University of Surrey, UK**

14:00 V	[90] Mitigation strategies for radiation damage during analysis of cultural heritage materials	BERTRAND, Loic (Université Paris-Saclay), France
14:20 V	[95] X-ray Microscale Spectroscopic Characterization in Cultural Heritage – Implications for the Monitoring and Mitigation of Radiation Effects	Samuel M. Webb SLAC National Accelerator Laboratory, USA
14:40	[76] Irradiation Passport for Art (IPA)	JOOSTEN, Ineke (Netherlands Institute for Cultural Heritage), Netherlands

## Break and Posters (15:10 - 15:30)

### Open Science and dissemination of knowledge

**Board Room C (15:30 - 16:20)**

**Session Chair: Mr Roger Webb, University of Surrey, UK**

15:30 V	[73] Beyond data FAIRification: converting New AGLAE data into digital heritage objects	PACHECO, Claire (C2RMF and New AGLAE, Palais du Louvre), France
16:00	[25] Infrared characterisation of cultural heritage objects: standard approach and going beyond diffraction limit	BANAS, Krzysztof (Singapore Synchrotron Light Source), Singapore

## How to make science tangible?

### Public awareness of how science and heritage work together in a tangible way

**– novel methods in education and outreach - Board Room C (16:20 - 17:00)**

**Session Chair: Mr Nasser Said AL-Jahwari, (Sultan Qaboos University), Oman**

16:20	[16] Scientific analysis of artworks as an ally for teaching science in current times	ORTIZ MIRANDA, Annette (National Gallery of Denmark), Denmark
16:40	[43] Human Skeleton Conservation at Choeng-Ek Genocidal Center in Phnom Penh, Cambodia	RY, Sovannarith (Ministry of Culture and Fine Arts), Cambodia

End of Day 3

## Thursday, 16 June 2022

### Application of accelerator science and technology for characterization and treatment of heritage objects

**Board Room C (08:30 - 11:50)**

**Session Chair: Ms Ineke Joosten, Netherlands Institute for Cultural Heritage, Netherlands**

08:30	[75] Accelerators, X-rays and cultural heritage: combining micro and macro level investigations with different purposes in mind	JANSSENS, Koen (AXIS Research group, NANOLab Centre of Excellence, University of Antwerp), Belgium
09:00 V	[7] Future Possibilities in Portable Accelerators for Cultural Heritage	CHARLES, Tessa (University of Liverpool), United Kingdom
09:20 V	[33] ACCELERATOR MASS SPECTROMETRY TECHNIQUES FOR CULTURAL HERITAGE STUDIES	LEVCHENKO, Vladimir (ANSTO), Australia
09:40	[80] The Determination of the Age of Creation of Metal Artefacts Using Radiogenic Helium	WEBB, Roger (Surrey Ion Beam Centre), United Kingdom
10:00 V	[26] Capabilities of MeV SIMS for identification of traditional and modern paint materials – building a database of binders and pigments	KRMPOTIĆ, Matea (Ruđer Bošković Institute), Croatia

### Break (10:20-10:50)

10:50 V	[74] Angle Dependent XRF for the analysis of Cultural Heritage Samples	ORSILLI, Jacopo (Università degli Studi Milano Bicocca), Italy
11:10 V	[47] The Neutron Resonance Transmission Imaging technique for elemental characterization of inhomogeneous samples	MARCUCCI, Giulia (Dipartimento di Fisica "G. Occhialini", Università degli Studi di Milano Bicocca and INFN, Sezione di Milano Bicocca), Italy
11:30	[45] Neutron imaging - an alternative tool for the study of cultural heritage objects	MANNES, David (Paul Scherrer Institut - PSI), Switzerland LEHMANN, Eberhard (PSI)

**Open Discussion: questions, comments, suggestions****Board Room C (11:50 - 12:30)****Lunch Break and Transfer (12:30 - 14:00)****Meeting with the Heritage Science Austria Network 14:00 - 17:30****Technical University Vienna, TUtheSky meeting room**

14:00	Welcome remarks Ms Klaudia Hradil, Technical University Vienna, Heritage Science Austria network Ms Aliz Simon International Atomic Energy Agency	
14:20	From X-radiography to tomography: How can imaging help us to conserve archaeological metal?	JOOSTEN, Ineke (Netherlands Institute for Cultural Heritage), Netherlands
14:50	[59] Material aging in the environment	PLOSZCZANSKI, Leon (Department of Material Sciences and Process Engineering BOKU - University of Natural Resources and Life Sciences) SIEDLACZEK, Philipp (IPM/Boku)
15:10	[24] MeV-SIMS for analysis of modern and contemporary paints - an accelerator-based method for analysis of synthetic organic components	JEMBRIH-SIMBÜRGER, Dubravka (Academy of Fine Arts Vienna)
15:30	[81] Highly-specific mapping of oil paintings to detect anachronistic pigments	JANSSENS, Koen (AXIS Research group, NANOlabor Centre of Excellence, University of Antwerp)
16:00	Closing of the Workshop Ms Melissa Denecke, Director of the Division of Physical and Chemical Sciences, IAEA, Vienna, Austria	
16:20-17:30	Social event	

End of the workshop