



IAEA

International Atomic Energy Agency

Atoms for Peace and Development

Technical Meeting on Expanding the Stakeholder Base of Nuclear Techniques for Forensic Science: Novel Applications and Niche Areas

IAEA Headquarters, Vienna, Austria

30 September – 3 October 2024

Ref. No.: EVT2304276

Information Sheet

Introduction

The IAEA is leading international efforts towards the development and utilization of nuclear analytical techniques for the preservation of cultural and natural heritage through characterization and dating with accelerator-based and complementary techniques [1]. Through its coordinated research project on “Enhancing Nuclear Analytical Techniques to Meet the Needs of Forensic Sciences (CRP No: F11021) multi-analytical techniques were developed and utilized for authentication and provenancing also for artifacts [etc. 2; 3]. The IAEA has recently published a review paper on *Addressing forensic science challenges with nuclear analytical techniques – A review* [4] to demonstrate the strengths and capabilities of Nuclear Analytical Techniques (NATs) in forensic science and hence open-up opportunities for their increased use in forensic casework.

Nuclear analytical techniques (NATs) that use X rays, ions and neutrons as probes are very versatile tools to identify the elemental and molecular composition near the surface, in the sub-surface and in the bulk, in some cases allowing for 2D and 3D probing of artifacts. Many of these techniques allow non-destructive analysis at tailored conditions and thus artifacts stay intact and can be returned after analysis. In addition, accelerator-based radiocarbon dating can identify the age of artifacts containing materials of biological origin. All this information is vital to define the materials and methods that were used to create an artifact, its age and its origin.

Authentication is primarily directed at cultural heritage artifacts and natural heritage objects subject to:

- Forgery, faking and looting;
- Illicit trafficking;
- Return or repatriation.

The use of NATs has strong potential to improve crime prevention and control [5]. To this end, the IAEA is working together with the United Nations Interregional Crime and Justice Research Institute (UNICRI) to support increased awareness of this potential among the law enforcement community, while gathering feedback from end users in view of the possible customization of the techniques for specific forensic areas and needs.

References:

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

[2] Thomas Calligaro et al.: Emerging nuclear methods for historical painting authentication: AMS-14C dating, MeV-SIMS and O-PTIR imaging, global IBA, differential-PIXE and full-field PIXE mapping, *Forensic Science International*, Volume 336, 2022, 111327, ISSN 0379-0738, <https://doi.org/10.1016/j.forsciint.2022.111327>

[3] Irka Hajdas et al.: The potential of radiocarbon analysis for the detection of art forgeries, *Forensic Science International*, Volume 335, 2022, 111292, ISSN 0379-0738, <https://doi.org/10.1016/j.forsciint.2022.111292>.

[4] A. Simon, N. P. Barradas, C. Jeynes, F. S. Romolo, Addressing forensic science challenges with nuclear analytical techniques – A review, *Forensic Science International* Volume 358, May 2024, 111767 <https://doi.org/10.1016/j.forsciint.2023.111767> (free access)

[5] [Joint Informal Technical Briefing - Home \(iaea.org\)](https://www.iaea.org/accelerators/accelerators4heritage)

Objectives

The purpose of the event is to enhance collaboration and information exchange within forensics science stakeholders and end users.

To facilitate this process participants are expected to share case studies where nuclear analytical techniques have been applied to authentication of (1) forged, fake or looted objects; (2) artifacts subject to illicit trafficking and (3) return or repatriation of artifacts. Participants are expected to show case studies highlighting needs and/or gaps or success stories related to forensic authentication of these objects/artifacts.

Target Audience

The event is intended for 1) both young and experienced nuclear scientists actively involved in the authentication and dating of artifacts and natural heritage objects for forensics purposes; 2) forensic, law-enforcement experts, regulators and policy makers; as well as 3) participants from humanities such as e.g. archaeologists, art historians, art dealers, auctioneers, and curators working in relevant fields.

Working Language(s)

The official language of the technical meeting is English (no interpretation will be provided).

Expected Outputs

Through scientific presentations, case studies and discussions, this technical meeting is aimed to deliver the following expected outputs:

- To identify the key infrastructures and stakeholders as research organisations, curators, museums, auction houses, heritage agencies, policy makers, legislators and relevant law enforcement actors in the field to explore the possibility to promote, establish and foster their international collaborations;
- To assess the need of developing Member States for support in the field of nuclear analytical services and development of own capabilities in nuclear analytical techniques;
- To assess Member States' needs related to relevant legislative and regulatory frameworks allowing the use of NATs for supporting law enforcement investigations in this field and use results of analysis as evidence.

Topics

The technical meeting aims at tackling the following key topics in the field of heritage science:

- Application and utilization of nuclear analytical techniques for provenance, traceability, authentication and dating of artifacts and natural heritage objects;
- Case studies and success stories from the fields of identification of a) forgery, faking and looting; b) illicit trafficking; c) return or repatriation of heritage objects;
- Interpretation, presentation and dissemination of the scientific results: case studies and success stories of nuclear analytical techniques applied to forensic science and to concrete law enforcement operations/investigations;
- Case studies on current challenges in heritage cases due to lack of analytical infrastructure, knowledge and cooperation between forensic scientists and law enforcers;
- Recent technological advances of nuclear and complementary analytical techniques relevant to forensic applications; use of artificial intelligence for data treatment and tracking criminal activities;
- Best practice and pathways for technology uptake in forensic applications.

Participation and Registration

All persons wishing to participate in the event have to be designated by an IAEA Member State or should be members of organizations that have been invited to attend.

In order to be designated by an IAEA Member State, participants are requested to send the **Participation Form (Form A)** to their competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) for onward transmission to the IAEA by **25 June 2024**. Participants who are members of an organization invited to attend are requested to send the **Participation Form (Form A)** through their organization to the IAEA by the above deadline.

Selected participants will be informed in due course on the procedures to be followed with regard to administrative and financial matters.

Participants are hereby informed that the personal data they submit will be processed in line with the [Agency's Personal Data and Privacy Policy](#) and is collected solely for the purpose(s) of reviewing and assessing the application and to complete logistical arrangements where required. The IAEA may also use the contact details of Applicants to inform them of the IAEA's scientific and technical publications, or the latest employment opportunities and current open vacancies at the IAEA. These secondary purposes are consistent with the IAEA's mandate.

Papers and Presentations

The IAEA encourages participants to give presentations on the work of their respective institutions that falls under the topics listed above.

All participants are requested to provide an abstract on their contribution to the meeting strongly related to the topic of the event to be presented as an oral or poster presentation in **Form B** by **25 June 2024 as part of their nomination**. The abstract should be in A4 page format, should extend to no more than 1 page (including figures and tables) and should not exceed 500 words.

The abstract will be reviewed as part of the selection process, and nominations without abstract will not be considered. Authors will be notified by email by **25 July 2024** of the acceptance of their proposed presentations.

Expenditures and Grants

No registration fee is charged to participants.

The IAEA is generally not in a position to bear the travel and other costs of participants in the event. The IAEA has, however, limited funds at its disposal to help meet the cost of attendance of certain participants. Upon specific request, such assistance may be offered to normally one participant per country, provided that, in the IAEA's view, the participant will make an important contribution to the event.

The application for financial support should be made using the **Grant Application Form (Form C)**

which has to be stamped, signed and submitted by the competent national authority to the IAEA together with the **Participation Form (Form A), Abstract, and Abstract Submission Form (Form B)** by **25 June 2024**.

Venue and accommodation

The event is an in-person meeting only. The event will be held at the Vienna International Centre (VIC) where the IAEA's Headquarters are located. Participants must make their own travel and accommodation arrangements.

General information on the VIC and other practical details, such as a list of hotels offering a reduced rate for IAEA participants, are listed on the following IAEA web page:

www.iaea.org/events.

Participants are advised to arrive at Checkpoint 1/Gate 1 of the Vienna International Centre (VIC) one hour before the start of the event on the first day in order to allow for timely registration. Participants will need to present an official photo identification document in order to be admitted to the VIC premises.

Visas

Participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of Austria at least four weeks before they travel to Austria. Since Austria is a Schengen State, persons requiring a visa will have to apply for a Schengen visa. In States where Austria has no diplomatic mission, visas can be obtained from the consular authority of a Schengen Partner State representing Austria in the country in question.

Additional Information

Participants are encouraged to visit the below web page regularly to check for new or updated information regarding the technical meeting:

<https://nucleus.iaea.org/sites/accelerators/Pages/cultural-heritage-events.aspx>

IAEA Contacts

Scientific Secretary

Ms Aliz Simon

Division of Physical and Chemical Sciences
Department of Nuclear Sciences and Applications
International Atomic Energy Agency
Vienna International Centre
PO Box 100
1400 VIENNA
AUSTRIA

Tel.: +43 1 2600 21706

Fax: +43 1 26007

Email: Aliz.Simon@iaea.org

Co-Scientific Secretary

Ms Lena Bassel

Division of Physical and Chemical Sciences
Department of Nuclear Sciences and Applications
International Atomic Energy Agency
Vienna International Centre
PO Box 100
1400 VIENNA
AUSTRIA

Tel.: +43 1 2600 21656

Fax: +43 1 26007

Email: L.Bassel@iaea.org

Administrative Secretary

Ms Ivana Andrejic-Dukic

Division of Physical and Chemical Sciences
Department of Nuclear Sciences and Applications
International Atomic Energy Agency
Vienna International Centre
PO Box 100
1400 VIENNA
AUSTRIA

Tel.: +43-1-2600-26393

Fax: +43 1 26007

Email: I.Andrejic-Dukic@iaea.org

Subsequent correspondence on scientific matters should be sent to the Scientific Secretaries and correspondence on other matters related to the event to the Administrative Secretary.

Participation Form

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To be completed by the participant and sent to the competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) of his/her country for subsequent transmission to the International Atomic Energy Agency (IAEA) either by email to: Official.Mail@iaea.org or by fax to: +43 1 26007 (no hard copies needed). Please also send a copy by email to the Scientific Secretaries Ms Aliz Simon and Ms Lena Bassel, Division of Physical and Chemical Sciences, Department of Nuclear Sciences and Applications (Email: Aliz.Simon@iaea.org, L.Bassel@iaea.org); and to the Administrative Secretary, Ms Ivana Andrejic-Dukic, (Email: I.Andrejic-Dukic@iaea.org).

Participants who are members of an invited organization can submit this form to their organization for subsequent transmission to the IAEA.

Deadline for receipt by IAEA through official channels: 25 June 2024

Family name(s): (same as in passport)	First name(s): (same as in passport)	Mr/Ms
Institution:		
Full address:		
Tel. (Fax):		
Email:		
Nationality:	Representing following Member State/non-Member State/entity or invited organization:	
If/as applicable: Do you intend to submit a paper? Yes <input type="checkbox"/> No <input type="checkbox"/> Would you prefer to present your paper as a poster? Yes <input type="checkbox"/> No <input type="checkbox"/> Title:		

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Form for Submission of a Paper

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Title of the paper:		
If applicable: Abstract ID in IAEA-INDICO:		
Family name(s) and first name(s) of all author(s) (same as in passport(s):	Scientific establishment(s) in which the work has been carried out	City/Country
1.		
2.		
3.		
Family name and first name(s) of author presenting the paper) (same as in passport):	Mr/Ms:	
Mailing address:		
Tel. (Fax):		
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- that the material submitted to the IAEA does not contain any libellous or other unlawful statements and does not contain any materials that violate any personal or proprietary rights of any person or entity.

Date:

Signature of main author:

Grant Application Form

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Family name(s): (same as in passport)	First name(s): (same as in passport)	Mr/Ms:
Mailing address:	Tel.:	
	Fax:	
	Email:	
Date of birth (yyyy/mm/dd):	Nationality:	

1. Education (post-secondary):

Name and place of institution	Field of study	Diploma or Degree	Years attended	
			from	to

2. Recent employment record (starting with your present post):

Name and place of employer/ organization	Title of your position	Type of work	Years attended	
			from	to

3. Description of work performed over the last three years:

4. Institute's/Member State's programme in field of event:

Date: _____ **Signature of applicant:** _____

Date: _____ **Name, signature and stamp of Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority**
