IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Training Workshop on the Applications of Accelerator-Based and Complementary Techniques for Forensic Science

Hosted by the

Government of Italy

through the

University of Salento's

CEnter of Applied Physics, DAting and Diagnostics (CEDAD) and

Institute of Advanced Interdisciplinary Studies (ISUFI)

UNIVERSITÀ DEL SALENTO
The University of the two seas

CEDAD
CEntro di Fisica applicata, DAtazione e Diagnostica

Scuola Superiore ISUFI

Lecce, Italy

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INFORMATION SHEET

Introduction

The use of accelerator-based analytical techniques for elemental and molecular analysis and dating is well established and such services are available through a great number of laboratories in Member States operating accelerator facilities. These techniques have also been proven to be extremely powerful in provenancing and authenticating samples relevant to forensic science. Possible areas of forensic applications include, but are not limited to, crime investigation, food safety and health-related issues, forging, or illicit trafficking of cultural heritage artefacts. Although, these analytical techniques are readily available and routinely applied in research, there is still a considerable gap in their use when it comes to routine forensic applications.

Accelerator-based analytical techniques require care in the interpretation of data and there is a lack of scientists who are trained in both the complexity of forensic interpretation and nuclear technology. In addition, in many cases it would not be practical or cost effective to place an accelerator facility within a forensic laboratory, but this limits the control a forensic practitioner has over the analysis. The development of these techniques as a recognized application for forensics requires awareness building, coordinated support and, in some cases, accreditation of the involved laboratories.

Objectives

The event will provide advanced training and enable information exchange for early-stage researchers as well as more experienced scientists interested in this novel application field. The event will cover a broad range of accelerator-based techniques, including ion beam analysis (IBA), accelerator mass spectrometry (AMS) and complementary analytical techniques. There are around 310 relevant ion beam accelerator facilities worldwide as shown in the interactive map of the IAEA Accelerator Knowledge Portal: https://nucleus.iaea.org/sites/accelerators/Pages/default.aspx.

A review of analytical capabilities of accelerator-based techniques, including the state-of-the-art and technical challenges and tailoring of nuclear analytical techniques to forensic applications will be presented and discussed with a special emphasis on their advantages and limitations. Case studies demonstrating strong collaboration between nuclear analysts and forensic end-users/law enforcement actors will be presented from the following areas: authentication of cultural heritage objects, detecting illicit trade of heritage objects and endangered animal species, food fraud, falsified medicines, drug detection and document authentication. Forensic end-user requirements for evidence analysis, chain of custody, accuracy and reliability of the data and their interpretation will be also part of the training.

Both accelerator scientists and forensic experts will provide lectures in order to promote knowledge transfer. Special emphasis will be given, both in the lectures and practical

exercises, to authentication and dating using Ion Beam Analysis and Accelerator Mass Spectrometry.

Target Audience

The event is open for accelerator scientists actively working in the field of ion beam analysis and accelerator mass spectrometry. Both early stage and experienced scientists are welcome to take part in the event. Forensic experts and forensic end-users/law enforcement actors are also eligible to attend.

Working Language

English

Structure

The event will be structured around lectures and practical exercises in the CEDAD laboratories.

Due to the practical exercises will be provided in the CEDAD laboratories, this training workshop will require physical presence of the participants.

Topics

- Introduction to forensic science, key aspects;
- Current challenges and unresolved issues in forensic science where nuclear technology can play a key role;
- End user requirements and pathway to adoption for new forensic methods;
- Recent advances of accelerator-based and complementary (e.g. SIMS, NAA, XRF, MS, IRMS, RAMAN, TEM-SEM, etc.) analytical techniques relevant to forensic applications;
- Analytical challenges in forensic applications;
- Chain of custody, accuracy and reliability and interpretation of the analytical data; • Case studies and success stories of nuclear technologies applied to forensic science.

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 **11 April 2022**. 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 above deadline.

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

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)** by **11 April 2022**.

Venue

The event will be hosted by the University of Salento in Lecce http://www.cedad.unisalento.it/en/. Lecce is located in the south-eastern part of Italy and is the capital of the Salento peninsula. Accommodation is available at reduced price for the guests of the University of Salento.

The closest airport is in Brindisi, about 40 km from the city centre. Public buses and private shuttle services are available and connect the airport terminals to the city centre (https://www.aeroportidipuglia.it/homepagebrindisi). The airport offers direct connections to Milan, Rome and other cities in Italy, while international connections are offered mainly by low-cost companies.

The event will have different venues in the city centre (opening ceremony), in the Lecce scientific campus and in the scientific park hosting CEDAD. Transportation services will be offered, free of charge, to the attendees.

Visas

Participants who require a visa to enter Italy should submit the necessary application as soon as possible to the nearest diplomatic or consular representative of Italy.

Organization

Chair and Scientific Secretary

Ms Aliz Simon Nuclear Physicist (Accelerators)

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Chair

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