



**IAEA**

International Atomic Energy Agency

*Atoms for Peace and Development*

# **Technical Meeting on Capitalizing on Artificial Intelligence Analysis to Accelerate the Technological Development of Evolutionary and virtual Innovative Reactor Designs**

**IAEA Headquarters, Vienna, Austria**  
and virtual participation via Cisco Webex

**4–7 November 2024**

**Ref. No.: EVT2303985**

## **Information Sheet**

### **Introduction**

The nuclear power industry is already benefiting from artificial intelligence (AI) applications, such as machine learning and deep learning techniques, to support the development of advanced nuclear power technologies and enhance the operational efficiency of nuclear power plants (NPPs). The integration of AI into nuclear technology, particularly for the purpose of optimizing the design, operation and maintenance of NPPs, has become imperative to ensure the safe and efficient use of nuclear energy.

Recognizing this, the IAEA has organized several events focused on the application of AI in areas ranging from advanced plant design to construction optimization and operational effectiveness. In March 2024, the IAEA organised a Technical Meeting on the Deployment of Artificial Intelligence Solutions for the Nuclear Power Industry: Considerations and Guidance, which focused on implementation considerations for Member States interested in the deployment of AI in NPPs. In parallel, the IAEA has established its first Collaborating Centre on AI for nuclear power applications at Purdue University. The centre will support IAEA programmatic activities on knowledge sharing, advancements and innovation in AI for nuclear power, allowing for its optimal integration, in particular for the purpose of optimizing the design, operation and maintenance of NPPs.

The current event is expected to provide valuable insights into how the integration of AI into the design phase can facilitate optimal designs, enable real time intelligent operations, enhance control and support decision making so as to take a significant safe and secure step forward in the field of nuclear technology.

## **Objectives**

The primary focus of the Technical Meeting is on harnessing AI to expedite the design process of new NPPs. This endeavour entails the application of AI to discern optimal configurations, materials, validation and experimental requirements, as well as operational parameters for evolutionary and innovative reactor designs. The event will facilitate discussions on the utilization of AI-driven simulations, data analytics and virtual prototyping to streamline the developmental life cycle of advanced reactor designs.

Specific objectives of the event encompass the presentation and deliberation of recent advancements in the development of AI tools for reactor design and operation, alongside the enhancement of understanding regarding the reliability of these methodologies. Moreover, the event aims to introduce both existing and emerging AI approaches, evaluate achievements and delineate future directions for AI. Discussions will extend to current and forthcoming R&D requirements associated with the integration of AI into nuclear engineering, with a focus on fostering information exchange and encouraging international collaborative activities in the realm of AI applications within the nuclear power sector.

Furthermore, the event will provide a platform for participants to engage in discussion sessions, affording them the opportunity to contribute to event summaries, elucidate key insights and offer recommendations to the IAEA for future initiatives. Contributions to the event in the form of technical papers, presentations and discussion sessions will result in the preparation of an IAEA publication. The publication is intended to serve as a reference guide for various stakeholders, including computer code developers, licensees, technology developers, national regulators and technical support organizations, while concurrently providing the public with a consolidated overview of ongoing efforts in this domain.

## **Target Audience**

The event is open to representatives of nuclear power organizations in Member States considering, planning or expanding a nuclear power programme, including government organizations (policymakers, analysts, national regulators, technical support organizations and R&D organizations), and industry (vendors, engineering companies, plant operators and technology developers).

## **Working Language(s)**

English.

## Topics

Presentations are invited to address key challenges, lessons learned, and emerging trends in AI for nuclear reactor design and operation. This event serves as an opportunity to further discuss the collaboration among industry, academia, and government agencies. The topics to be discussed encompass a wide range of areas, including the utilization of AI to accelerate technological development in nuclear reactor designs; employing AI for reactor physics simulations and modelling; implementing AI-driven optimization techniques for determining reactor design parameters; exploring the application of AI for predictive maintenance and safety analysis; examining the potential benefits, limitations and challenges associated with AI implementation; discussing techniques for data acquisition, integration, pre-processing and cleaning in support of AI analysis; investigating the use of AI for enhancing reactor performance; assessing risk using AI algorithms; addressing ethical considerations and implementing risk management strategies; and exploring human-machine interface considerations in the context of AI-enabled nuclear operations.

## 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 or invited organization, participants are requested to submit their application via the InTouch+ platform (<https://intouchplus.iaea.org>) to the competent national authority (Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) or organization for onward transmission to the IAEA by **31 August 2024**, following the registration procedure in InTouch+:

1. Access the InTouch+ platform (<https://intouchplus.iaea.org>):
  - Persons with an existing NUCLEUS account can sign in to the platform with their username and password;
  - Persons without an existing NUCLEUS account can register [here](#).
2. Once signed in, prospective participants can use the InTouch+ platform to:
  - Complete or update their personal details under ‘Complete Profile’ and upload the relevant supporting documents;
  - Search for the relevant event under the ‘My Eligible Events’ tab;
  - Select the Member State or invited organization they want to represent from the drop-down menu entitled ‘Designating Authority’ (if an invited organization is not listed, please contact [InTouchPlus.Contact-Point@iaea.org](mailto:InTouchPlus.Contact-Point@iaea.org));
  - If applicable, indicate whether financial support is requested and complete the relevant information (this is not applicable to participants from invited organizations);
  - Based on the data input, the InTouch+ platform will automatically generate the Participation Form (Form A) and/or the Grant Application Form (Form C);
  - Submit their application.

Once submitted through the InTouch+ platform, the application, together with the auto-generated form(s), will be transmitted automatically to the required authority for approval. If approved, the application, together with the applicable form(s), will automatically be sent to the IAEA through the online platform.

NOTE: The application for financial support should be made, together with the submission of the application, by **31 August 2024**.

For additional information on how to apply for an event, please refer to the [InTouch+ Help](#) page. Any other issues or queries related to InTouch+ can be sent to [InTouchPlus.Contact-Point@iaea.org](mailto:InTouchPlus.Contact-Point@iaea.org).

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. Further information can be found in the [Data Processing Notice](#) concerning IAEA InTouch+ platform.

## Papers and Presentations

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

Participants who wish to give presentations are requested to submit a technical paper or an extended abstract of their work. All contributions will be reviewed as part of the selection process for presentations. The manuscript, in A4 page format, should be at least 2 pages for extended abstracts and should extend to no more than 12 pages for technical papers (including figures and tables). Abstracts and technical papers should be sent electronically to Mr Alexei Miassoedov and Ms Nelly Ngoy Kubelwa, the Scientific Secretaries of the event (see contact details below), not later than **31 August 2024**. Authors will be notified of the acceptance of their proposed abstracts and papers by **15 September 2024**.

In addition to the registration already submitted through the InTouch+ platform, participants have to submit the abstract, together with the Form for Submission of a Paper (Form B), to the competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) or organization for onward transmission to the IAEA not later than **31 August 2024**.

## 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, together with the submission of the application, by **31 August 2024**.

## Venue

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](http://www.iaea.org/events).

Participants are advised to arrive at Checkpoint 1/Gate 1 of the 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.

## IAEA Contacts

### Scientific Secretaries:

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

## Form for Submission of a Paper

### Technical Meeting on Capitalizing on Artificial Intelligence Analysis to Accelerate the Technological Development of Evolutionary and Innovative Reactor Designs

**IAEA Headquarters, Vienna, Austria**

**4 to 7 November 2024**

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](mailto: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 Secretary ([A.Miassoedov@iaea.org](mailto:A.Miassoedov@iaea.org)) and to the Administrative Secretary ([N.Kinovas@iaea.org](mailto:N.Kinovas@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 as per Conference Announcement.**

Title of the paper:		
If applicable: Abstract ID in IAEA-INDICO:		
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2.		
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**Date:**

**Signature of main author:**