

# **Technical Meeting on Artificial Intelligence for Nuclear Technology and Applications**

**Monday, 25 October 2021 - Friday, 29 October 2021**

**Virtual Event**

## **Topics**

The **plenary cross-cut sessions** will focus on the following topics:

**Enabling Infrastructure**  
**Advanced Modelling and Simulation Methodologies**

The **working group sessions** – whose participants and talks will be established by the Organizers of the Sessions – will focus on the following thematic areas:

**Ethics**  
**Food and Agriculture**  
**Human Health**  
**Nuclear Data**  
**Nuclear Fusion**  
**Nuclear Physics**  
**Nuclear Power**  
**Nuclear Security**  
**Radiation Protection**  
**Radioisotopes and Radiation Technology**  
**Safeguards Verification**  
**Water and Environment**

## **(Plenary) Enabling Infrastructure**

**Keywords:** artificial intelligence; machine learning; open data science; standardized frameworks; comprehensive data management; uncertainty quantification; data curation; high performance computing; advanced manufacturing; educational and training activities; ethics.

## **(Plenary) Advanced Modelling and Simulation Methodologies**

**Keywords:** integrated modelling; multi-physics multiscale modelling; virtual systems/digital twin technology; optimized system design; improved system performance and user experience.

## **(Working Group) Ethics**

**Keywords:** trustworthiness; human rights; sustainability objectives; AI ethics (water ethics, climate ethics, ethics and health, AI and nuclear safety, AI-energy ethics).

## **(Working Group) Food and Agriculture**

**Keywords:** food authentication; food safety early warning systems; soil type prediction; insect screening; plant viability screening.

## **(Working Group) Human Health**

**Keywords:** diagnosis and treatment of cancer; image interpretation; treatment plans and contouring; adaptive radiotherapy; medical processes.

## **(Working Group) Nuclear Data**

**Keywords:** nuclear, atomic and molecular data; data analysis; verification; uncertainty quantification; anomaly detection; information discovery.

## **(Working Group) Nuclear Fusion**

**Keywords:** plasma prediction; control system; model generation.

## **(Working Group) Nuclear Physics**

**Keywords:** data analysis; data management; experimental design and optimization; facility operation.

## **(Working Group) Nuclear Power**

**Keywords:** outage; maintenance; planning; scheduling; inspection; training; engineering assessment; risk assessment; machine learning.

## **(Working Group) Nuclear Security**

**Keywords:** anomaly detection; data analysis (flow, sensor, image); data integration; data management; defensive computer security (network) architecture; internet of things – cloud services; information protection; performance assessment; systems design analysis; threat analysis; training; vulnerability management.

## **(Working Group) Radiation Protection**

**Keywords:** computer simulations including work simulations; processes including radiation exposure with algorithms; health and safety in workplaces; radiological data across machines; radiation protection programmes; online dosimetry; optimization; planning and training; validation by measurements; instrumentation; robotics.

## **(Working Group) Radioisotopes and Radiation Technology**

**Keywords:** radiopharmaceutical design and modelling; radiation dose distribution - animal models and irradiated samples; sediment transport calculations; heat transfer and cooling of targets.

## **(Working Group) Safeguards Verification**

**Keywords:** nuclear measurements; surveillance; non-destructive assay; tampering detection; gamma spectroscopy; spent fuel verification; Cerenkov light; dynamic calorimetry; fissile mass quantification.

## **(Working Group) Water and Environment**

**Keywords:** water security and protection; complex data analysis – spatial and temporal; groundwater modelling; study of the hydrological cycle; climate models.