

### Pool of Course Lecturers

#### **K. Abbas**

Nuclear Physicist, joined JRC Karlsruhe in 1995, currently in charge of R&D and trainings in Nuclear Security, Safeguards and Nuclear Decommissioning and Waste management in IRC Ispra.

#### **Y. Aregbe**

Responsible for analytical methods for nuclear material measurements at European Commission Joint Research Centre in Geel.

#### **J. Baute**

Joined IAEA in 1994 and became director of Iraq's Nuclear Verification Office. Presently he is director of the IAEA Safeguards Information Management Directorate.

#### **R. Bencardino**

Former Team Leader in the Accountancy Services of Euratom Safeguards: the unit ENER.E5-Accountancy and International Obligations. Presently, project leader in the Nuclear Decommissioning Unit of JRC (Ispra).

#### **P. Funk**

Is since more than 10 years involved in French and International safeguards as leader of C/S lab at IRNS.

#### **M. Gerlini**

Matteo Gerlini teaches History and Policy of the scientific research in the University of Florence. He participates as Italian expert in the IAEA and NEA working and consultation meetings.

#### **J. Dahlberg**

Safeguards analyst, Section of Concepts and Approaches, IAEA.

#### **W. Janssens**

Is head of the Nuclear Security and Safeguards Department at the European Commission Joint Research, including the unit Nuclear Security in Ispra and the unit Nuclear Safeguards and Forensics in Karlsruhe.

#### **T. Jonter**

Is heading the Department of Economic History at the Stockholm University, leading educational programs on Nuclear Non-proliferation at different Universities in former Soviet Union.

#### **C. Kröger-Negoita**

Deputy Head of the Unit "Inspections: reactors, geological repositories and other installations" in Directorate-General for Energy of the European Commission.

#### **G. Maenhout**

Is currently professor at the University Ghent in Belgium, teaching nuclear reactor theory, safety and safeguards. Before she was leading the Process Monitoring Team in the nuclear safeguards unit at the European Commission JRC in Ispra.

#### **Q. Michel**

Professor in European Studies and President of the Department of Political Science of Liège University.

#### **E. Montero**

Operations Division as Geospatial/Image Analyst for European Satellite Centre (SatCen).

#### **P. Peerani**

Presently he is Head of Unit of the Nuclear Decommissioning and Waste Management at the European Commission JRC in Ispra. Before, Paolo was leading for over 10 years the group on NDA for nuclear security and safeguards.

#### **L. Rockwood**

Is the Executive Director of The Vienna Centre for Disarmament and Non-Proliferation (VCDNP). She worked for almost 30 years at IAEA, focusing primarily on the negotiation, interpretation and implementation of safeguards.

#### **L. Roussel**

Nuclear Material Accounting and Control Coordination for the Orano group facilities in France.

#### **M. Tarvainen**

Former IAEA staff, Senior Safeguards Technology Expert, Office for Verification in Iran, Department of Safeguards. Presently Independent Non-Proliferation Professional in MJT Consulting in Finland.

#### **C. Crawford**

Section Head, Nuclear and Radiological Security, National Security Sciences Directorate, Oak Ridge National Laboratory.

#### **T. Terasaki**

Director, Safeguards Office, Nuclear Regulation Authority, Japan.

#### **H. Tagziria**

Scientific Officer at EC-JRC in the fields of nuclear safeguards, nuclear security, non-proliferation, neutron counting, calorimetry, nuclear disarmament verification technologies and Non-Destructive Analysis techniques.

#### **L. Van Den Durpel**

Expert in Nuclear fuel Cycle in Strategic Analysis and Technology Prospective. He is Managing Director of Nuclear-21.Net (Belgium).

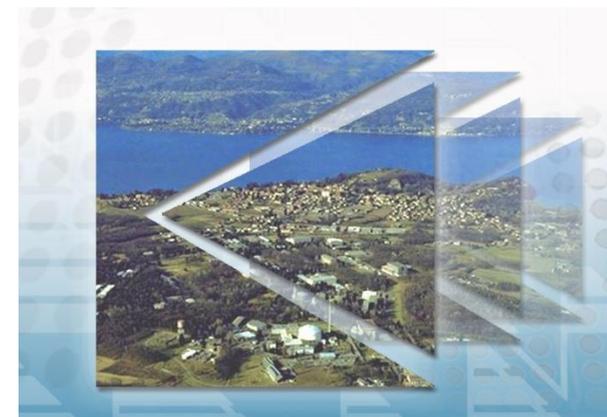
#### **J. Vidaurre**

Joined the IAEA's Secretariat in 1981 then appointed Head of the Section for Safeguards Training in 1998 in IAEA. He retired from IAEA in 2009 and presently he is an international consultant. He spent some years in JAEA.

#### **M. Wallenius**

Works on destructive assay measurements and is responsible for nuclear forensics at JRC Karlsruhe.

## 20<sup>th</sup> ESARDA Course Nuclear Safeguards and Non-Proliferation



**On-line (via MS TEAMS)**  
**Monday 16<sup>th</sup> - Friday 20<sup>th</sup> May, 2022**

Organised by the Joint Research Centre, Directorate of Nuclear Safety & Security, Department Nuclear Security & Safeguards, Unit Nuclear Security, (Ispra, Italy)  
 under  
 the Training and Knowledge Management of the European Safeguards Research & Development Association, (ESARDA TKM WG)

## Origin of the course

The knowledge retention issue in the nuclear field was acknowledged by the OECD in 2000. The United Nations study on disarmament and non-proliferation education (2002) made detailed recommendations for urgently required improvements. ESARDA, the European Safeguards Research and Development Association reacted to these shortcomings with a strategy to tackle the issue and created a Working Group on Training and Knowledge Management (ESARDA WG TKM). The final objective of the ESARDA WG TKM is the setup of academic course modules to an internationally recognised reference standard.

This project is in line with the movement of establishing a European curriculum for Nuclear Engineering. Teaching in the Nuclear Safeguards field is indeed strongly influenced by national history so the objective of the course is to provide homogeneous material in Nuclear Safeguards and Non-Proliferation matters at the European and international level.

## Learning objectives

This compact course is open to master degree students, in particular nuclear engineering students, but also to young professionals and International Relations/law students. It aims at complementing nuclear engineering studies by including nuclear safeguards in the academic curriculum.

The basic aim of the course is to stimulate student interests in safeguards. The course addresses aspects of the efforts to create a global nuclear non-proliferation system and how this system works in practice: the Treaty on Nonproliferation of Nuclear Weapons (NPT), safeguards technology, and export control. Also regional settings, such as EURATOM Treaty, are presented and discussed. The course deals in particular with technical aspects and application of safeguards; i.e. how to implement the safeguards principles and methodology within the different nuclear facilities. Therefore the course will create an overview on inspections techniques, ranging from neutron/gamma detection methods, to design information verification, to environmental sampling, etc.

## Course content

**Introduction:** The evolution of the Non-Proliferation Treaty-regime, safeguards, international control regimes in theory and practice, and present trends in the nuclear non-proliferation efforts.

**What is safeguarded:** Definition of nuclear material that is subject to nuclear safeguards and related safeguards goals (significant quantity, timeliness and detection probabilities).

**Where is it found:** Description of the nuclear fuel cycle from mining to final repository, focusing on enrichment in the front-end and reprocessing in the back-end.

**Which legal protection means exist:** Overview on international and regional Non-Proliferation Treaties and established Institutions and Organisations.

**What is the methodology to verify:** Nuclear material accountancy principles and statistics of auditing.

**How are inspections performed:** Overview on inspector tools and their use to verify the nuclear activities as declared under the safeguards agreements (Non-Destructive Assay, Monitoring, Containment/Surveillance); additional safeguards measures under the Additional Protocol (complementary access, satellite imagery, environmental sampling) and how they are applied in field (storage facility, process facility, enrichment facility, research institute, spent fuel transfer).

**How to control Import/Export:** Guidelines of the Nuclear Suppliers Group, trigger list and dual-use list. Means to combat illicit trafficking, inclusive nuclear forensics.

**What additional information is offered:** Collection of open source data and demonstration of some case studies.

## Practical organisation

The 20<sup>th</sup> edition of the ESARDA Course (ESARDA Course 2022) will be organized on-line and will feature a full five-days program with lectures, group exercises and virtual visits of some JRC Ispra (Italy) research laboratories.

The course material, consisting of a syllabus, a complete set of presentations and literature, will be provided to the participants. It is recommended to the students to prepare themselves beforehand using the material that will be available.

On a voluntary basis, participants are encouraged to take an exam, which includes two parts. The first part is an on-line multiple-choice questionnaire, which will take place during the week course. The second part consists in writing an essay on a nuclear safeguards or non-proliferation topic. Up to two best essays can be selected for being published in the ESARDA Connector journal or for being presented in a poster session at the next ESARDA Symposium. Successful students can include this course in their academic curriculum as it is recognised by BNEN/ENEN for 3 ECTS points.

The enrolment in the course is limited to 150 students and the registration is on "First-Come, First-Served" basis. Please visit <https://esarda.jrc.ec.europa.eu> for more information on the course and more importantly to download the pre-registration form to be filled-in and returned **by April 4<sup>th</sup> 2022** to the email address of ESARDA Course 2022 secretariat:

[JRC-DIR-G-ISPRA-EVENTS@ec.europa.eu](mailto:JRC-DIR-G-ISPRA-EVENTS@ec.europa.eu)

Upon acceptance of your file by the course organizer committee, you will be notified for enrolment in the course and to proceed with the final registration. **There is no course fee.**

**For more information, email to:**

[JRC-DIR-G-ISPRA-EVENTS@ec.europa.eu](mailto:JRC-DIR-G-ISPRA-EVENTS@ec.europa.eu)

**Venue:** On-line via MS TEAMS

**Course Schedule:**

Monday, May 16<sup>th</sup> 2022 at 8:30

To Friday, May 20<sup>th</sup>, 2022 at 16:00