

Computational Methods in Dosimetry State of the Art and Emerging Developments

Thursday, 23rd June 2022, 9:00 – 16:30 (CET)

Scope

Computational methods play an important role in many fields of radiation research and dosimetry. Examples range from radiation transport and track structure simulations by Monte Carlo methods to unfolding techniques (e. g. to derive neutron energy distributions from experimental data). Radiation transport simulations are widely used for the design, optimisation, and analysis of experiments and together with track structure simulations are an important tool for understanding radiation effects and radiation risk. The radiation protection quantities are defined in anthropomorphic computational phantoms and can only be calculated via Monte Carlo simulations.

In the medical field, the move towards personalised medicine implies an important role for patient-specific dosimetry that involves increasingly complex computations and development of numerical phantoms taking into account individual variability of the persons to be examined or treated. Other important developments are approaches to monitor personal doses in real-time by computational methods and the increasing use of methodologies based on artificial intelligence.

Many of the modern codes used in computational dosimetry have been developed in recent years to the point where performing simulations, deconvolving spectra, etc., have become seemingly simple tasks that do not require expertise to obtain results. However, a series of Intercomparison exercises organised in recent years by EURADOS WG6 "Computational Dosimetry" revealed tremendous deviations of reported results prior and posterior to respective feedback.

The fundamental theme of the EURADOS School will therefore be the question of reliability of computations in dosimetry, including aspects like the increasing digitisation of measurement instruments and certificates. All lectures will be given by internationally well-known scientists who are involved in the field. Participants will receive a certificate of attendance.

Topics

- EURADOS Intercomparisons in Computational Dosimetry
- Novel approaches and computational tools
- Digitisation in Radiation Protection
- Artificial Intelligence in Radiation Dosimetry

Scientific Committee

- Hans Rabus (Physikalisch-Technische Bundesanstalt – PTB, Germany)
- Marie-Anne Chevallier (Institut de Radioprotection et Sûreté Nucléaire – IRSN, France)
- Rick Tanner (UK Health Security Agency – UKHSA, United Kingdom)
- Filip Vanhavere (Nuclear Research Centre – SCK CEN, Belgium)

Event Accreditation

The EURADOS School has been accredited by EBAMP as CPD event for Medical Physicists at EQF Level 8 and will be awarded 21 CPD credit points.

Although the Annual Meeting is scheduled as a full live event, we foresee the possibility to follow the EURADOS School online. A special fee will be asked to follow the online EURADOS School.

Programme of the 15th EURADOS School

Time	Topic	Speaker
9:00	Welcome on behalf of the Scientific Committee	Hans Rabus PTB (Germany)
9:05	Introduction to Computational Dosimetry	Paolo Ferrari ENEA (Italy)
9:35	Monte Carlo Radiation Transport Simulations	Vladimir Markovic University Kragujevac (Serbia)
10:05	Unfolding Neutron Spectra from Bonner Sphere Measurements	Carles Domingo Miralles UAB (Spain)
10:35	EURADOS Intercomparisons in Computational Dosimetry	Rick Tanner UKHSA (UK)
11:05	Coffee break	
11:30	OpenDose3D, a free/open clinical dosimetry software for nuclear medicine	Manuel Bardiès INSERM (France)
12:00	New developments in radiotherapy treatment planning with particle beams	Emanuele Scifoni TIFPA (Italy)
12:30	Accelerating Monte Carlo simulations	Francesc Salvat-Pujol CERN (Switzerland)
13:00	Lunch	
14:30	Implementation of ICRP computational reference phantoms in different exposure scenarios	Maria Zankl HMGU (Germany)
15:00	Personal online dosimetry using flexible computational phantoms	Pasquale Lombardo SCK CEN (Belgium)
15:30	Data Processing in Radiation Protection Dosimetry	Robert Bernat RBI (Croatia)
16:00	The emerging role of artificial intelligence in internal radiation dosimetry	Habib Zaidi HCUGE (Switzerland)
16:30	End of the EURADOS School	

Please, register for this event via the EURADOS AM2022 registration platform.