



Joint IAEA and Argonne National Laboratory Masterclass on Computed Tomography Clinical Physics and Optimization

Hosted by the

Government of the United States of America

through the

Duke University

Durham, North Carolina, United States of America

14 - 19 October 2024

Ref. No.: EVT2400777

Information Sheet

Introduction

Computed Tomography (CT) has revolutionized medical diagnosis and treatment, offering detailed cross-sectional images of the body's internal structures. Since its inception in the early 1970s, CT technology has become an indispensable tool in the medical field, facilitating the early detection of diseases, guiding surgical procedures, and monitoring treatment outcomes. Its importance in modern healthcare cannot be overstated, with applications ranging from acute trauma assessment to cancer management and cardiovascular disease evaluation. This precision is critical for accurate diagnosis, planning surgical interventions, and tailoring treatment strategies to individual patient needs.

However, the effective use of CT technology demands a comprehensive understanding of its underlying physics. The principles of X-ray generation, attenuation, image reconstruction, and the effects of varying parameters on image quality are fundamental to optimizing CT practices. Knowledge of these principles is essential for medical physicists to ensure the highest quality of imaging while minimizing radiation exposure to patients. Furthermore, optimization of CT imaging involves a delicate balance between obtaining the necessary diagnostic information minimizing radiation dose. This requires a deep

understanding of factors such as dose modulation, image reconstruction algorithms, and the selection of appropriate imaging protocols tailored to specific clinical indications. Acknowledging all these needs, the International Atomic Energy Agency (IAEA) is organizing this course to address the global need for heightened expertise in the field of medical physics, CT quality assurance (QA), dosimetry and clinical optimization. This initiative underscores the IAEA's commitment to promoting the safe, secure, and peaceful use of nuclear technologies, including in healthcare.

Objectives

The purpose of this masterclass is to orient and train medical physicists from around the world through sharing of experience and strategy on CT physics practice, informed by best processes in place at Duke University and beyond. Program includes the following:

- Didactic lectures covering topics of CT physics, practice, safety, and quality
- Clinical practice rounds with focus on appropriateness, safety culture, and workflow
- Practicum: safety-relevant demonstrations of the interplay of dose, image quality, and patient size
- CT protocol definition and management
- CT specialized practices including contrast-enhanced CT, cardiac CT, interventional CT, perfusion CT, and photon-counting CT
- In vivo and in vitro measures of quality assessment and assurance

Target Audience

The workshop is open to up to 30 participants from participating Member States of the IAEA. Noting that the scope of the training course is related to enhancing patient care in CT imaging practice through a masterclass, medical physicists need to be nominated by each Member State to strengthen CT medical physics activities and facilitate initiation of relevant activities in the Member States.

The participants should be medical physicists providing medical physics services in a clinical environment pertaining to CT procedures, and/or individuals closely familiar with such services including Quality Management Systems and formal Quality Assurance procedures. The participants will be requested to submit a short summary of their experience on the CT QA, QC or dosimetry.

This course is not intended for participants working for regulatory authorities or as inspectors.

It is strongly advised that the participants bring their own laptops with them to this course as various software programs will be used and/or required to be installed prior to the masterclass.

Working Language(s)

English

Expected Outputs

The expected outputs will be to make participants acquainted with different components of a formal quality system for CT imaging. Topics will include CT Physics foundations, specialized CT technologies, specialized CT practices, in vivo and in vitro quality assurance methods, and optimization of dose and image quality. Detailed information is provided in the subsequent topics.

Topics

- The main topics of this course will be:
- Basics of CT physics
- Basics of quality
- Assessment of CT quality
- Measurement of quality/performance indicators
- Drafting formal procedures
- Equipment specific QA/QC and dosimetry requirements
- Optimization

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 May 2024**. 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 the above deadline.

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.

Expenditures and Grants

No registration fee is charged to participants.

Selected participants will receive a stipend for meals and incidental expenses as well as a contingency allowance from the host organization (Argonne National Laboratory); accommodation costs will be directly paid by Argonne National Laboratory. The participants will also receive a round-trip air ticket based on the most direct and economical route between the airport nearest their residence and the airport nearest the event location.

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 May 2024**.

Visas

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

Organization

Scientific Secretary

Ms Virginia Tsapaki

Division of Human Health
Department of Nuclear Sciences and Applications
International Atomic Energy Agency
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AUSTRIA

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Email: V.Tsapaki@iaea.org

Administrative Secretary

Ms Simona-Mihaela Ciortan

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International Atomic Energy Agency
Vienna International Centre
PO Box 100
1400 VIENNA
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Fax: +43 1 26007

Email: S.M.Ciortan@iaea.org

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

Participation Form

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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 or by fax to: +43 1 26007 (no hard copies needed). Please also send a copy by email to the Scientific Secretary, Ms Virginia Tsapaki, Division of Human Health, Department of Nuclear Sciences and Applications (Email: V.Tsapaki@iaea.org) and to the Administrative Secretary, Ms Simona-Mihaela Ciortan, (Email: S.M.Ciortan@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: 11 May 2024

Family name(s): (same as in passport)	First name(s): (same as in passport)	Mr/Ms
Institution:		
Full address:		
Tel. (Fax):		
Email:		
Birthplace and Nationality:	Representing following Member State/non-Member State/entity or invited organization:	
If/as applicable:		
Do you intend to submit a paper?	Yes	No
Would you prefer to present your paper as a poster?	Yes	No
Title:		

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

Grant Application Form

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Deadline for receipt by IAEA through official channels as per Conference Announcement.

Family name(s): (same as in passport)	First name(s): (same as in passport)	Mr/Ms:
Mailing address:	Tel.:	
	Fax:	
	Email:	
Date of birth (yyyy/mm/dd):	Nationality:	

1. Education (post-secondary):

Name and place of institution	Field of study	Diploma or Degree	Years attended from to	

2. Recent employment record (starting with your present post):

Name and place of employer/ organization	Title of your position	Type of work	Years attended from to	

3. Description of work performed over the last three years:

4. Institute's/Member State's programme in field of event:

Date: _____ **Signature of applicant:** _____

Date: _____ **Name, signature and stamp of Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority**
