Workshop on X-ray imaging dosimetry

Programme draft: 2024-08-20 (subject to changes)
Place: Helsinki university hospital, Finland
When: 20 – 22 November 2024
Workshop hotel: Scandic Meilahti
Linked with the EURAMET 22NRM01 TraMeXI project
More information: https://tramexi.com/workshop/

Wednesday: 20 November 2024

X-ray dosimetry fundamentals and codes of practice

Lunch (not included)

12:00 – 12:10 Welcome

- Dosimetry as a bridge to overall beam characterisation (10 min)
  Mika Kortesniemi HUS and Paula Toroi, HUS/STUK, Finland
  - Traceable measurements of air kerma based quantities.
  - Complete characterisation with spectrometry.

12:10 - 13:00 Dosimetry equipment principles and operation

- Ionization chambers (ICs)and X-ray multimeters (XMMs) (20 min)
  Stefan Pojtinger, PTB, Germany
  - Principles, performance
- Quantities and parameters beyond air kerma (20 min)
  Milos Zivanovic, VINS, Serbia and Markus Borowski, SKBS, Germany
  - Measurement of tube voltage related quantities
  - Other quantities
- Calibration (10 min)
  Leon de Prez, VSL, the Netherlands
  - Primary standards, calibration conditions, assumptions, certificate

13:00 – 13:30 Introduction on imaging modality specific measurement procedures 1.

- Overall introduction (20 min)
  Luigi Rinaldi, OPBG, Italy
  - General measurement protocols, TRS-457
  - Conventional projection X-ray
  - What will change when XMMs are used instead of IC
- Discussion (10 min)

Coffee break 13:30-14:00

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14:00 -15:40 Developments in mammography dosimetry

- 14:00 – 15:00 New CoP: EFOMP-AAPM breast dosimetry protocol (60 min)
  Ioannis Sechopoulos, the Netherlands
  - Dosimetry model
  - Measurement of air kerma
    - Standard, contrast-enhanced and tomosynthesis
  - Determination of AGD
- 15:00 - 15:20 Novel radiation qualities and spectra measurements (20 min)
  Elisabeth Salomon, PTB, Germany
  - Range of radiation qualities
  - Spectrometry methods
  - XMM results
- 15:20 – 15:30 XMM results in mammography (10 min)
  Andrea Kojic, VINS, Serbia
- Discussion (10 min)

Break 15:40-16:00

16:00 – 16:30 Introduction on imaging modality specific measurement procedures 2.

- Interventional (including C-arms, CBCT), (15 min)
  Jouni Uusi-Simola, HUS, Finland
- CT (including wide beams) (15 min)
  Mika Kortesniemi, HUS, Finland

16:30 -17:00 Clinical usage of calibration certificate

- How to use calibration certificates in clinical practice (20 min)
  Nikola Kržanović, VINS, Serbia / Paula Toroi, STUK/HUS, Finland
- Discussion (10 min)

17:00 – 18:00 Dosimetry companies presenting their products

- List later…(5-10 min each)
- Discussion 10 min

Social event 18:00 –

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Thursday: 21 November 2024
Practical approach and uncertainties

9:00 – 10:30 Patient specific dosimetry

- What is patient dose? (20 min)
  Bente Konst, Vestfold, Norway and Linköping, Sweden
  - Measurable quantity vrs. Organ doses
- MC simulations: skin dose in interventional radiology (30 min)
  Jonas Andersson, University of Umeå, Sweden
- Use of AI in dosimetry (30 min)
  Satu Inkinen, HUS, Finland
- Discussion (10 min)

Coffee break 10:30-11:00

11:00 – 12:30 Uncertainties

- Theory and practice for air kerma and HVL (30 min)
  Aino Tietäväinen, STUK, Finland
- Practical example for clinical measurements (20 min)
  Niko Kiiskinen, HUS, Finland
- Practical example for skin dose (30 min)
  Jonas Andersson, University of Umeå, Sweden
- Discussion 10 min

Lunch break 12:30 – 14:30

- Long lunch break with a walk outside

14:30 – 18:00 Practical exercises

- Practical exercises (video connection) 14:30 – 16:30
  - Measurement group: 1 with camera, 2 persons measuring.
    - Conventional 25 min video+25 min for the analysis of results
    - Interventional 25 min video+25 min for the analysis of results
    - Mammography 25 min video+25 min for the analysis of results
  - Moderator: 1 person the meeting room
  - Short breaks between

- Practical: calculation of uncertainties 1 16:30 – 18:00
  - Using the data collected in the practical session
  - Additional data from TraMeXI group

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Friday: 22 November 2024
Plans for future: targets and aims

9:00 – 10:00 Feedback,

- Update of Code of Practice
  Miloš Živanović, VINS, Serbia
  - Summary from discussions on practical sessions
  - Feedback on update of protocols (to TraMeXI)

10:00 – 11:00 Invited lecture

- Deep learning-powered multimodality medical imaging
  Prof. Habib Zaidi, Geneva, Switzerland

Coffee break 11:00-11:30

11:30 – 13:00 What is our target?

- Short introduction (30 min)
  Miloš Živanović, VINS, Serbia and Markus Borowski, SKBS, Germany
  - Why we do dosimetry?
  - How we use dosimetric data?
  - what are current target uncertainties and why?
  - what is expected clinically?
  - what is currently provided by the manufacturers and calibration laboratories?
- Discussion (50 min)
  - What should be the target uncertainty?
  - What is clinically needed?
  - What is expected for different purposes (QA, research, optimization)?
- Conclusions and Farewell (10 min)

Mika Kortesniemi HUS and Paula Toroi, HUS/STUK, Finland

The workshop ends.

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The workshop is organized in collaboration with:

NACP
Nordic Association for Clinical Physics
Radiological Physics Committee

The workshop is endorsement by:

EFOMP
EUROPEAN FEDERATION OF ORGANISATIONS FOR MEDICAL PHYSICS

The workshop is sponsored by:

To be added later

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