



Special Symposium 1

EARL / NEMA

Sunday, October 18, 08:00–09:30

Session Title

New Image Quality and Sensitivity Methods for NEMA NU 2 and IEC 61675-1 PET Standards

Chairpersons

Ekaterina Zoubenko (Haifa, Israel)

John Sunderland (Iowa City, Iowa, United States of America)

Programme

- 08:00–08:15 **Glenn Wells** (Ottawa, Canada): Introduction to New NEMA NU 2 and IEC 61675-1 PET Sensitivity and Image Quality Standards
- 08:15–08:35 **Ekaterina Zoubenko** (Haifa, Israel): A New ²²Na Point Source Methodology for NEMA and IEC PET System Sensitivity Measurement
- 08:35–08:55 **Timothy Turkington** (Durham, North Carolina, United States of America): Introduction of a New NEMA Image Quality Phantom with Modified Acquisition and Analysis Methodology
- 08:55–09:10 **John Sunderland** (Iowa City, IA, United States of America): The New NEMA Image Quality Phantom: Applications Beyond Acceptance Testing and System Characterisation

Educational Objectives

1. Relay the relevance of the NEMA NU 2 and IEC 61675-1 PET standards, the limitations of current standards, and the rationale for the upcoming changes.
2. Explain the rationale for the new ²²Na point source sensitivity standard and its acquisition and analysis methods.
3. Discuss the new image quality phantom design and acquisition and analysis methodologies.

Summary

The purpose of the NEMA NU 2 and IEC 61675-1 standards is to provide standardised methods to measure and specify the performance of positron emission tomography (PET) systems for system specifications, acceptance testing, quality control, scanner qualification and other tasks. Continuous advances in PET hardware and software have necessitated continuous evolution of these standards.

Two new methodologies have been introduced and harmonised between the NEMA NU 2 and IEC 61675-1 standards. One in the measurement of system sensitivity, and the second in image quality assessment.

The new sensitivity strategy utilised a traceable ²²Na point source in lieu of ¹⁸F in the concentric aluminium sleeves. Data is acquired by moving the point source incrementally through the axial field of view (aFOV). The new image quality test implementation challenges the improved resolution of current PET scanners and uses a modified NEMA image quality phantom with twelve spheres ranging in size from 6–22 mm. The new acquisition and analysis methodology uses a 40-minute acquisition replayed into multiple short-duration frames that accounts for the length of the axial field of view (aFOV).

Key Words

NEMA NU 2, IEC, Phantom, Quality Control