PARTNERS IN SOLUTION IMAGING/DIAGNOSTIC QA SOFTWARE
Tuesday July 14, 3:30 pm - 5:30 pm
Yu Liu
Medical College of Wisconsin, Milwaukee, WI
Steve Dyer: "AutoQA Plus - Catphan QA"
QA Benchmark, LLC, Frederick, MD
Kenneth Ruchala: "RapidCHECK Software for Diagnostic"
Sun Nuclear Corporation, Madison, WI
Brian Cote: "Necessity of monitor quality control and total management with QA software"
EIZO, Inc., Cypress, CA

PARTNERS IN SOLUTION IMAGING/DIAGNOSTIC QA SOFTWARE
Thursday July 16, 1:00 pm - 3:00 pm
Yu Liu
Medical College of Wisconsin, Milwaukee, WI
Erik Wikstrom: "Ocean -- RTI's QA Software -- How can it improve Workflow?"
RTI Group North America
Felix Schofer: "QA solutions for cone beam and computed tomography QA"
QUART GmbH
Matt Whitaker: "Interfacility and machine image quality analysis using a cloud-based system"
Image Owl, Inc.

Learning Objectives
- Understand various accreditation organizations’ imaging physics QA requirements
- Learn commercially available QA software analysis tools

Introduction
- Importance of Quality Assurance (QA)
- QA requirements for Diagnostic Medical Physics
- QA Tasks: Diagnostic Medical Physics
- Solutions From Vendors (Tue & Thurs)
- Questions and Answers

Importance of Quality Assurance for Diagnostic Medical Physics
- Quality and safety improvement for patient care and safety
- Mammography Quality Standards Act (MQSA)(1992)
- Medicare Improvements for Patients and Providers Act (MIPPA)(2008)

QA requirements for Diagnostic Medical Physics
- The Joint Commission (TJC)
- American College of Radiology Accreditation (ACR)
- Intersocietal Accreditation Commission (IAC)
- ACR-AAPM-SIIM Technical Standard for Electronic Practice of Medical Imaging
Diagnostic Imaging Modalities Requiring Physics QA - TJC

- X-ray radiography/Fluoroscopy
- Computed Tomography
- Magnetic Resonance Imaging
- Nuclear Medicine/Positron Emission Tomography (PET)

Diagnostic Imaging Modalities Requiring Physics QA - ACR

- Computed Tomography
- Magnetic Resonance Imaging
- Nuclear Medicine/SPECT/Positron Emission Tomography (PET)
- Digital mammography
- Ultrasound

Diagnostic Imaging Modalities Requiring Physics QA - IAC

- Computed Tomography
- Magnetic Resonance Imaging
- Nuclear Medicine/Positron Emission Tomography (PET)

X-ray Radiography/Fluoroscopy QA

- kVp accuracy and consistency
- Exposure vs. kVp and mAs
- HVL
- Timer accuracy
- Light field vs. radiation field
- Dose rate
- Maximum dose rate

Computed Tomography/CBCT QA

- ACR Computed Tomography Quality Control Manual 2017

ACR Computed Tomography QA

- CTDvol measurements
- CT number (HU) uniformity
- CT number (HU) accuracy
- Image slice thickness
- High contrast resolution
- Distance measurement accuracy
- Low contrast performance and Contrast-to-Noise Ratio (CNR)
- Laser alignment accuracy/scan localizer accuracy
- Artifact evaluation
- Acquisition display monitor
Magnetic Resonance Imaging Physics QA

ACR Magnetic Resonance Imaging QA
- Image uniformity
- Geometric accuracy
- High contrast spatial resolution
- Low contrast detectability
- Slice position accuracy
- Slice thickness accuracy
- Laser alignment accuracy/scan localizer accuracy
- Artifact evaluation
- Display monitor
- RF coil and other testing

Nuclear Medicine/SPECT Physics QA

ACR Nuclear Medicine/SPECT QA
- Energy resolution
- Count rate parameters
- Intrinsic/System image uniformity
- Intrinsic/System spatial resolution
- High contrast spatial resolution
- Low contrast detectability
- Image uniformity
- Artifact evaluation
- Display monitor
- Misc.

Positron Emission Tomography Physics QA

ACR Positron Emission Tomography QA
- Spatial resolution
- Phantom image quality
- Image uniformity
- Accuracy of CT#
- Monitor evaluation
- Sensitivity
- Count rate performance
- Image co-registration
- Accuracy standard uptake value (SUV)
Digital Mammography/Digital Breast Tomosynthesis (DBT)

- Mammography Quality Standard Act (MQSA)
- ACR Mammography Quality Control Manual (1999)
- 2018 ACR Digital Mammography Quality Control Manual, Rev. 2 (May 2020)

ACR Digital Mammography/DBT QA

- Phantom image quality
- DBT Z resolution
- Spatial Resolution
- DBT volume coverage
- Automatic exposure control system performance
- Average Glandular Dose
- Acquisition workstation monitor
- Radiologist workstation monitor

ACR Ultrasound Physics QA

- Image uniformity
- Geometric accuracy
- System sensitivity
- Contrast resolution
- Spatial resolution
- Artifact evaluation
- Display monitor
- Misc.

Imaging Modalities Requiring Display Monitor QA

- Digital Mammography/DBT (MQSA)
- Computed Tomography
- Magnetic Resonance Imaging
- Nuclear Medicine/SPECT/PET
- Ultrasound

Display Monitor QA


Display Monitor QA

- Ambient lighting
- Display Luminance and Grayscale Display Function (GSDF)
- Display color
- Luminance uniformity
- Display noise
- Temporal performance
- Spatial resolution
- SMPTE, TG-18, TG-270 and test patterns
Imaging/Diagnostic QA Software

- Some QA procedures are labor extensive without QA software
- Performance trend analysis may not be possible without QA software
- Other workflow and efficiency limitations without QA software