



## Diagnostic and Nuclear Medical Physics Residency Program Summary of Rotation Presentation Topics

*Last updated: 8/2023*

### **Radiography**

- (2022) Dependence of exposure index (EI) on differences in the determination of the value of interest (VOI)
- (2022) Impact of calibration conditions on the results of AEC performance tests
- (2021) Diagnostic reference levels (DRLs) for adult and pediatric radiographic exams
- (2021) Exposure and practice analytics in digital radiography
- (2021) NCRP recommendations for ending routine gonadal shielding during abdominal and pelvic radiography (NCRP Statement No. 13) – *Journal Club*
- (2020) Advanced image processing in digital radiography
- (2020) Dual energy x-ray absorptiometry (DXA)
- (2019) EOS scoliosis imaging system
- (2019) Dental radiographic technologies
- (2018) Radiographic techniques for scoliosis patients
- (2018) Exposure index in digital radiography
- (2017) Heel effect and how to mitigate it in clinical procedures, physics testing and image processing
- (2017) AAPM TG 151: ongoing quality control in digital radiography
- (2016) Routine applications, special procedures, and QC for projection radiography

### **Fluoroscopy**

- (2022) 3D C-arm Cone Beam CT: Image quality and QC considerations following TG 238
- (2022) Clinical Observation: Endoscopic Retrograde Cholangiopancreatography
- (2021) Fluoroscopic pulse rate in modified barium swallow studies
- (2021) Review and Application of Donald L. Miller's paper: Review of air kerma-area product, effective dose and dose conversion coefficients for non-cardiac interventional fluoroscopy procedures
- (2020) Fluoroscopy-guided trans-catheter aortic valve replacement (TAVR)
- (2020) The process of estimating peak skin dose (PSD) in fluoroscopy
- (2019) My clinical observations of non-interventional fluoroscopy procedures
- (2019) Medical physics guide to calculating peak skin dose from RDSR data
- (2018) My shadowing experience in non-interventional fluoroscopy
- (2018) Interventional fluoroscopy in cardiology

- (2017) Patient skin dose estimation in fluoroscopic procedures
- (2017) TheraSphere® Yttrium-90 microsphere therapy
- (2016) Clinical applications and methods to monitor and reduce patient dose in fluoroscopy

## **Mammography**

- (2023) Mammography Reporting System & Audit Program
- (2023) CAD in FFDM and DBT
- (2022) Cabinet Systems
- (2022) Mercy ACR DMQC Rollout for 2022
- (2021) Contrast enhanced mammography
- (2021) Detector calibration in mammography
- (2020) Mammography screening recommendations and data
- (2020) Medical physicist's tests in the 2018 ACR digital mammography QC manual
- (2019) Contrast-enhanced digital mammography and tomosynthesis-guided biopsies
- (2019) Technology improvements in Siemens DBT: Insite 2D and EMPIRE
- (2018) Breast tomosynthesis: clinical use, accreditation and technical parameters
- (2018) PRIME: digital mammography with grid-less acquisition and software-based scatter correction
- (2017) My clinical shadowing experience in mammography

## **IT and Display**

- (2023) The Effect of Image Resolution on Deep Learning in Radiography
- (2022) Two real-world scenarios in imaging informatics
- (2022) An Introduction to syngo.via Cinematic Rendering
- (2021) Practical application of AAPM Report 270 in display quality assurance: A report of Task Group 270 – *Journal Club*
- (2021) AAPM Report No. 248: interoperability assessment for the commissioning of medical imaging acquisition systems
- (2018) Computer-aided diagnosis in low-dose CT lung cancer screening
- (2018) Overview of deep learning in medical imaging – *Journal Club*

## **CT**

- (2023) Radiation dose tracking for CT
- (2023) Calculation of scan length and size-specific dose at longitudinal positions of body CT scans using dose equilibrium function - *Journal Club*
- (2023) CT Angiography and Aortic Dissection: An Interesting Case from My CT Clinical Observations
- (2022) Robotic-assisted knee replacement and the role of CT
- (2021) CT metal artifacts and reduction techniques
- (2021) CT imaging of CSF brain leak

- (2021) Size-specific dose estimate (SSDE) in body and head CT
- (2020) Technological advances and dose reduction in cardiac CT
- (2020) Deep learning image reconstruction in computed tomography
- (2019) Magnification correction factors for size-specific dose estimates (SSDE) calculations
- (2019) Pediatric CT protocol optimization
- (2018) Coronary angiography with computed tomography
- (2018) CT dose reduction technology
- (2017) CT regulations and patient dose tracking

## **MRI**

- (2023) Passive Shimming in MRI
- (2023) MRI of the Shoulder and MRI Shoulder Arthrogram
- (2022) Shoulder MRI: Fast Sequence Protocol
- (2022) MRI ACR Medium phantom
- (2021) MRI contrast agents
- (2021) Knee MRI: clinical use and pulse sequences
- (2020) MRI shimming
- (2020) MRI flow imaging
- (2019) Diffusion-weighted imaging in MRI
- (2019) Breast cancer screening with MRI
- (2018) Liver iron quantification with MR imaging
- (2018) MR-guided high-intensity focused ultrasound (MRgFUS)
- (2017) MRI scanners, physics testing and patient procedures

## **Ultrasound**

- (2023) Ultrasound Venography: A Non-invasive Way to Locate Deep Vein Thromboses
- (2022) Neurovascular Ultrasound: Patient case study
- (2021) Breast ultrasound: accreditation and clinical use
- (2020) Echocardiography
- (2019) Spatial compound imaging in ultrasound
- (2019) Clinical applications and accreditation of breast ultrasound
- (2017) Ultrasound accreditation, quality assurance, artifacts and clinical applications

## **Radiation Safety**

- (2023) Trends in Medical Radiation Exposure
- (2022) Communicating radiation risk to patients
- (2020) Regulatory structure for diagnostic radiation safety in the United States
- (2019) NCRP Report No 180: management of exposure to ionizing radiation: radiation protection guidance for the United States – *Journal Club*
- (2018) Overview of accreditation bodies for advanced imaging services

- (2017) Summary of NCRP 147

### **Nuclear Medicine: Hot Lab**

- (2022) Hot Lab: CZT Detectors, Raysafe Detector
- (2021) Hot Lab Instrumentation: What Do They Use, How Do They Work, When and How Are They Tested
- (2020) Radiopharmaceutical production and image quality

### **Nuclear Medicine: Gamma Camera**

- (2022) Gamma Camera Basic Principles and SPECT Image Reconstruction
- (2021) Classic and Modern Theranostics
- (2020) AAPM Report No. 177 (Section 5): acceptance and annual testing of gamma camera
- (2020) Clinical application of ion chamber and GM counter in Yttrium-90 therapy procedures

### **Nuclear Medicine: PET**

- (2023) Evaluation of CT-Based Lean-Body SUV
- (2022) PET Performance Measurements Using the NEMA NU-2-2001 Standard
- (2022) PET/CT Acceptance Testing and Quality Assurance: The Report of AAPM Task Group 126
- (2021) Effect of image reconstruction parameters on PET quantitative accuracy and image quality

### **Nuclear Medicine: Safety and Dosimetry**

- (2023) NCRP Commentary 31: Development of Kinetic and Anatomical Models for Brain Dosimetry for Internally Deposited Radionuclides
- (2022) Should Lead Aprons Be Used in Nuclear Medicine Departments?
- (2021) Regulations pertaining to nuclear medicine safety

### **Additional Journal Club**

- (2023) Deep Learning in Nuclear Medicine & Molecular Imaging: Current Perspectives & Future Directions
- (2017) AAPM Report No. 301: an updated description of the professional practice of diagnostic and imaging medical physics