

SMPCETS Open Day 2025

Foundation Year as a Medical Physics Trainee

Eirin Beese

Trainee Clinical Scientist in MRI Physics

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Medical Physics

Year 1

Full-time MSc

University of Glasgow
or
University of Aberdeen

MSc Project

Year 2

Four 10 week rotations:

- Radiotherapy
- Diagnostic Radiology and Radiation Protection
- MRI Physics
- Nuclear Medicine

Mid-way Portfolio and Viva

Year 3 - 3.5

Specialism Training
(centre and speciality specific)

3-6 months
Innovation Project

AHCS Equivalence Portfolio and
Viva

HCPC Registration

Foundation Year Timeline

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Placement 1	Placement 1													
Placement 2			Placement 2											
Acquaintanceship(s)														
Placement 3														
Placement 4														
Portfolio Submission														
Midway QA Viva														

Ultrasound Week in
Edinburgh

Title	Date	Details	Self-study	Deliverables	Supervisor	Sign-off status
MRI Safety	09/12/2022	MR Safety - Assistance with MRI implant safety assessments (n~5), to be safety evaluated for 1.5T and 3.0T throughout placement. - Familiarise with governance framework for generic implant safety policies - Discuss and perform MRI site safety audit (individual task) - * Site Audit Mini-project (address backlog) - Comparison of safety issues at 1.5T, 3T and 7T - Review risk assessment - Incident review - Discuss safety aspects for RHC (PHB - safety for patient and staff, dept layout and equipment, training of staff)	Familiarity with MRI Safety - MHRA guidelines - Local rules - Review safety lecture	- Updated risk assessment - Discussion of safety assessment conclusions, MHRA guidelines and general safety questions - Awareness of safety issues around magnets, gradients, RF, cryogenics, comparison of safety issues at 1.5T, 3T and 7T, safety guidelines	john.mclean@ggc.scot.nhs.uk	Approved
Introduction and Basic MRI Sequences	09/19/2022	Introduction and Basic MRI Sequences - QEUH Campus, MRI Unit and ICE Tour (JF/JMcL) - Meet staff, complete personal safety questionnaire, patient confidentiality discussion (JF/JMcL) - Explain aspects of MRI Physicist role in the context of the training plan and how MRI Physics fits into the NHS structure (JF/JMcL) - Supervised operation of the MRI Scanner (direct observation). - Imaging of fruit phantoms in order to illustrate T1W, T2W and PD contrast. - Imaging of T2 decay phantoms and calculation of T2 values	Spin Echo, Gradient Echo, Inversion Recovery, Contrast, SNR Trade-offs - Review introductory lectures - Self-directed reading online (e.g. imaio, mri-q, revisemri) and MRI textbooks	- Discussion and Self Study - Write up of fruit scanning and Q2 calculations	sarah.allwood-spier@ggc.scot.nhs.uk	Approved
MRI Theory	09/26/2022	MRI Theory - k-space investigation - T1 and T2 measurements	Proton NMR experiment, MRI experiment - Review NMR lecture - Self-directed reading on theory of basic NMR (flip angles, FID, T1 and T2 relaxation). - Self-directed reading on the fundamentals of MR Imaging (RF pulses, spatial encoding, slice selection, k-space, image formation).	- Discussion and Self Study assessment - k-space investigation summary - Report on Q1 and Q2 analysis	maria.lopez-gonzalez@ggc.scot.nhs.uk	Approved
Routine Clinical Applications	10/03/2022	Routine Clinical Applications - Case studies of normal or diseased examples to highlight anatomy and/or pathology of three major clinical areas from: neuro (brain or spine), musculoskeletal (knee, hand, shoulder) or body (liver or MRCP).	Advanced Sequences, Suppression Techniques - Self-directed reading around spoiled GE, steady state GE, fast SE, partial-Fourier and single-shot SE techniques	- Discussion and Self Study assessment - Case studies	pauline.hallbarriento@ggc.scot.nhs.uk	Approved

Training Plan

- Based on Minimum Deliverable Content (MDC)
- Electronic sign-off of competencies from supervisors

MRI

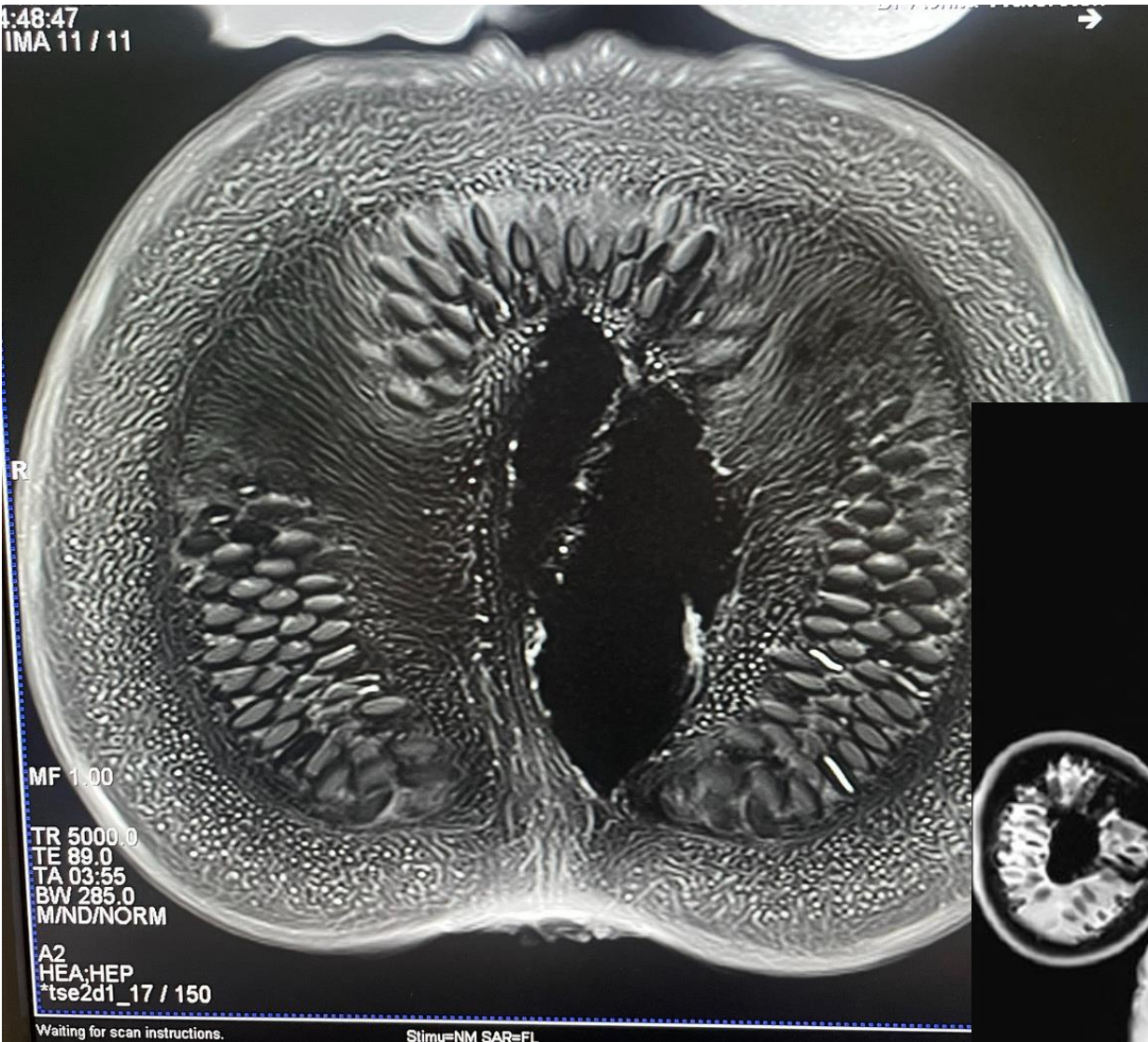
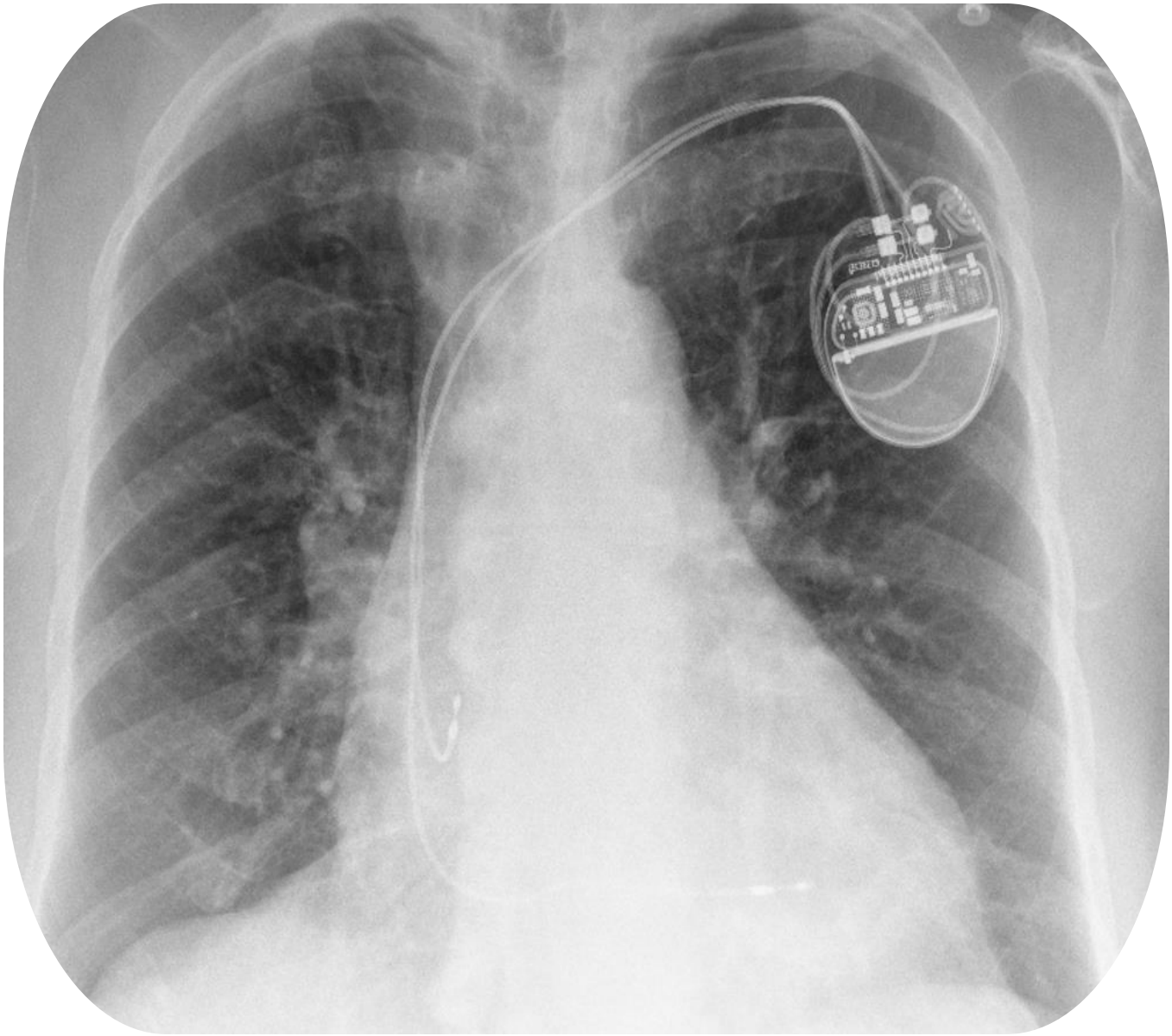
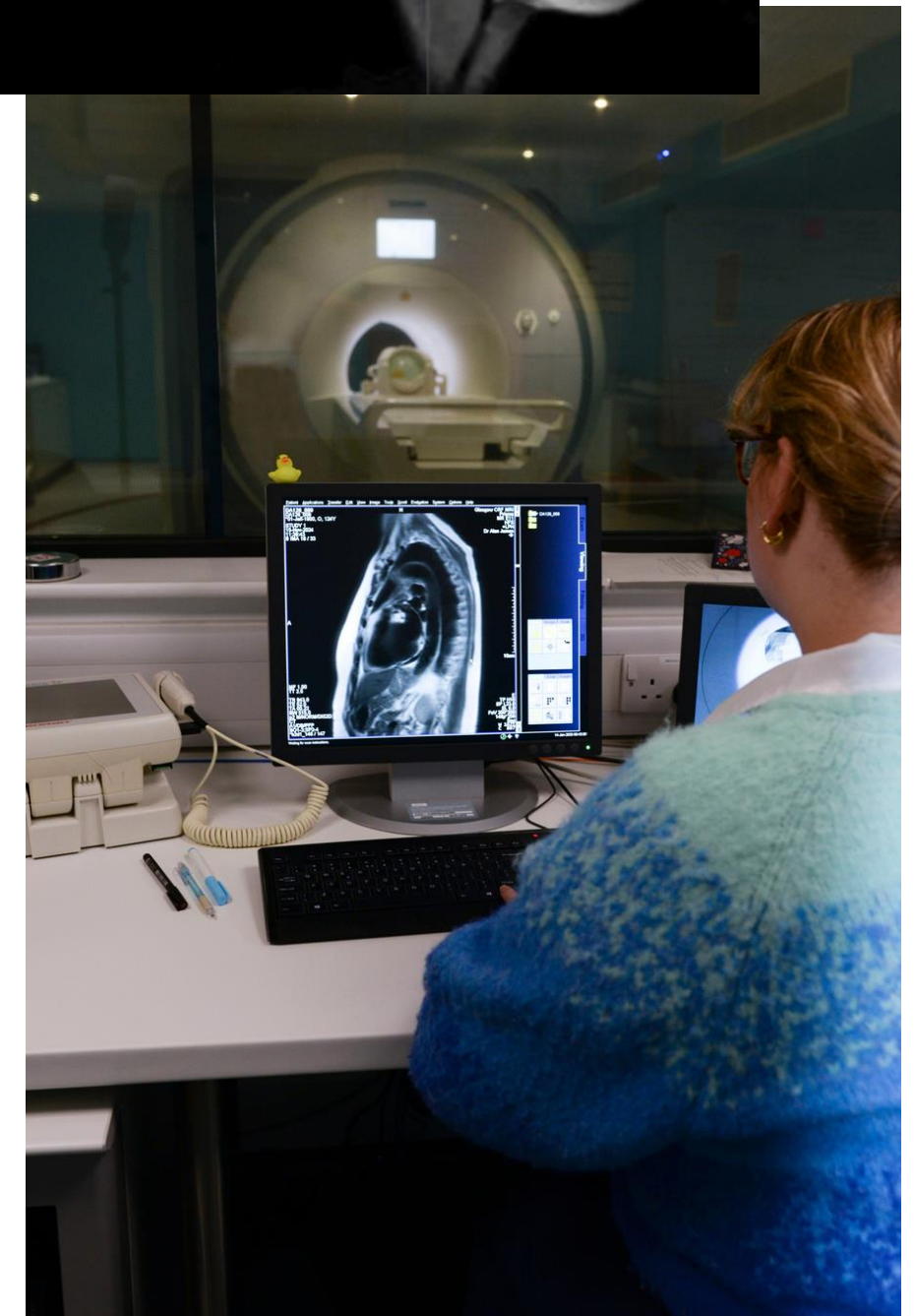
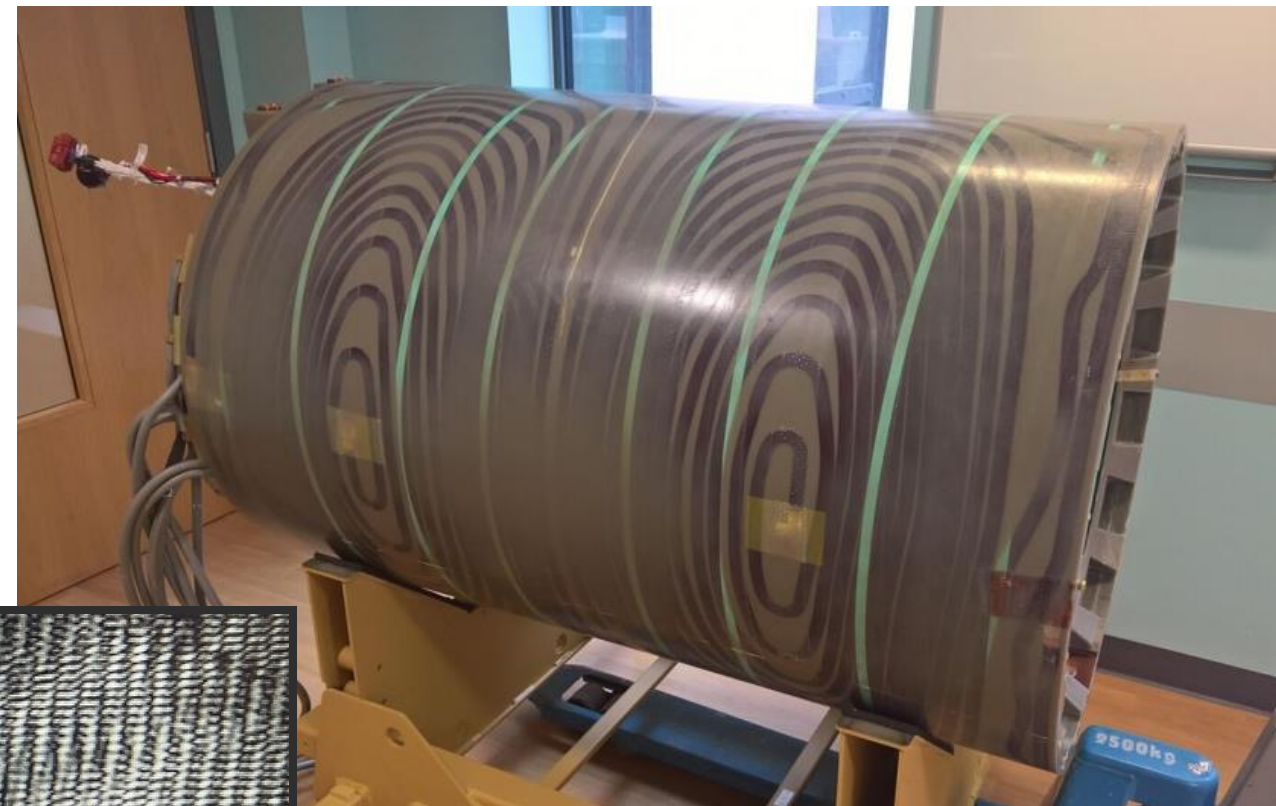
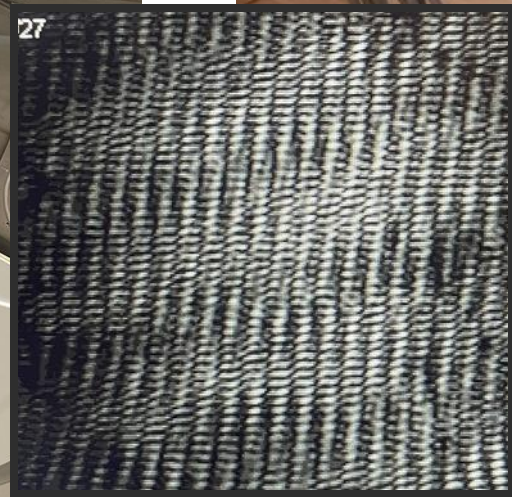
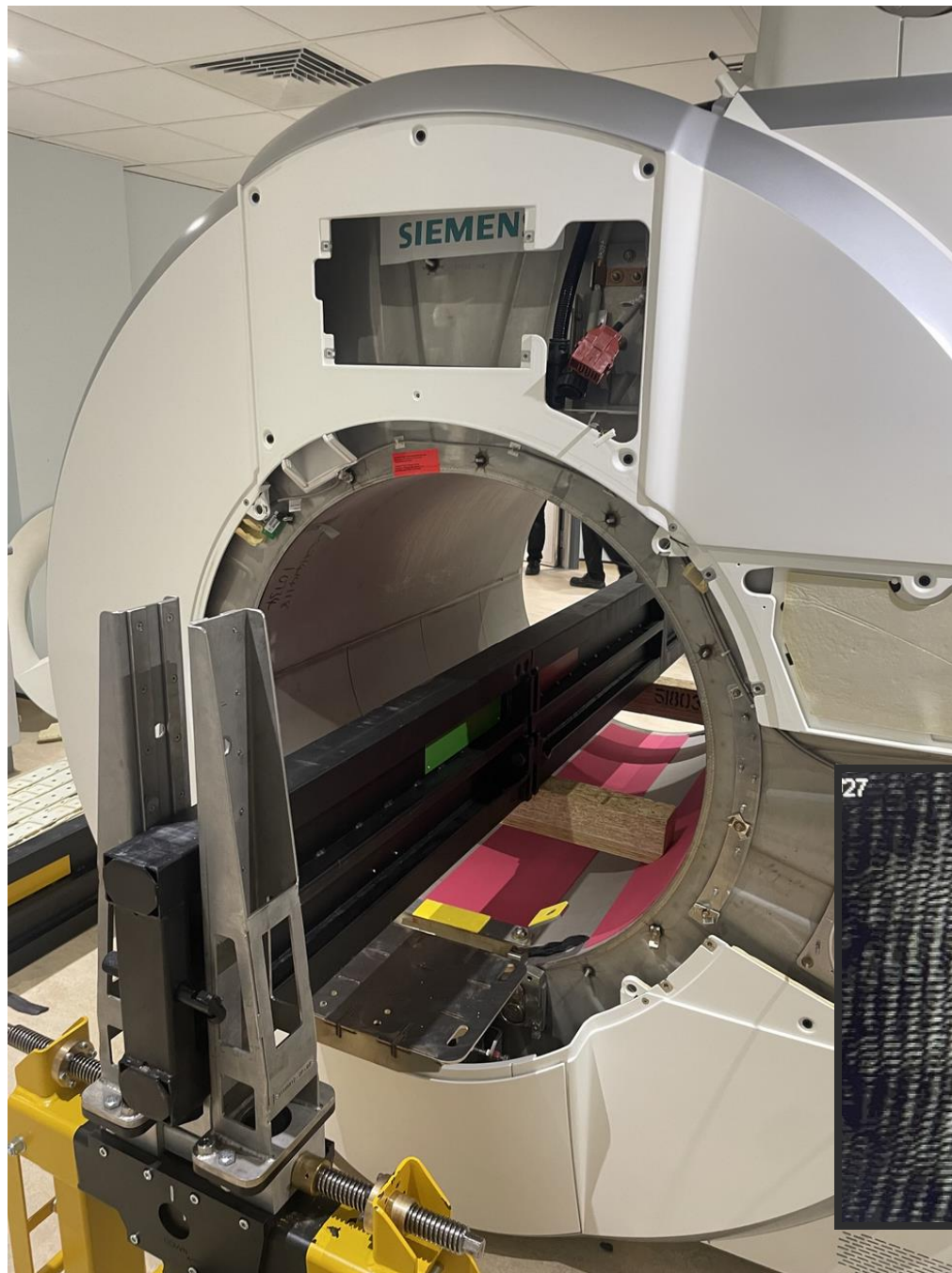
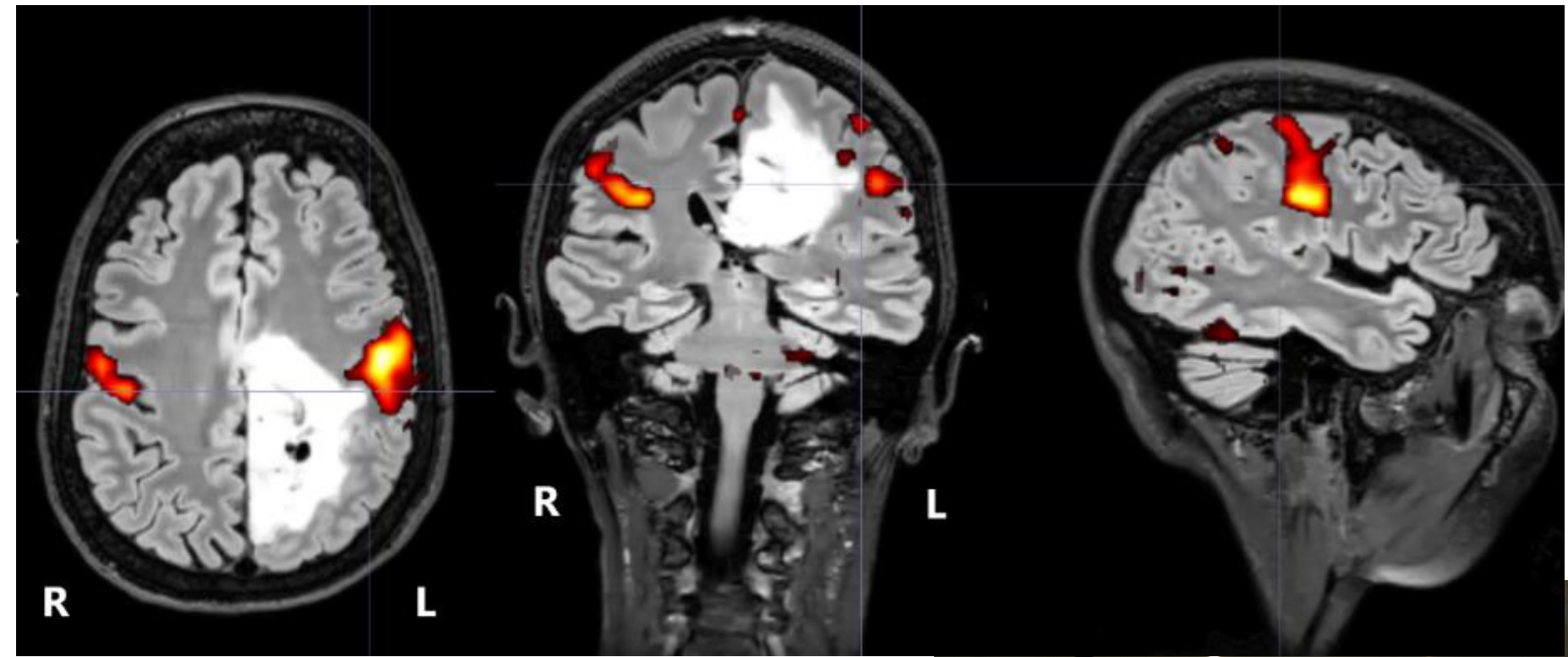


Table 1-1. Valid Combinations of Pacemaker Pulse Generators and Leads to Use in 1.5 T and 3 T Environments

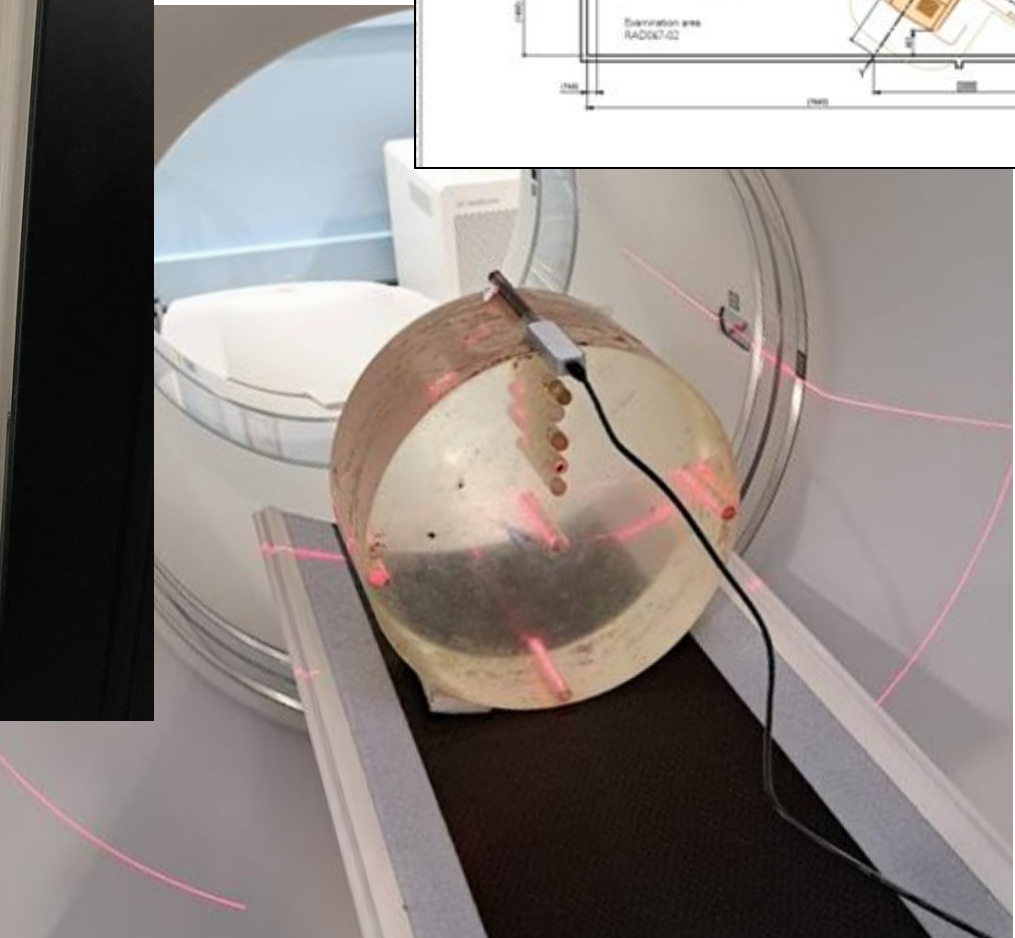
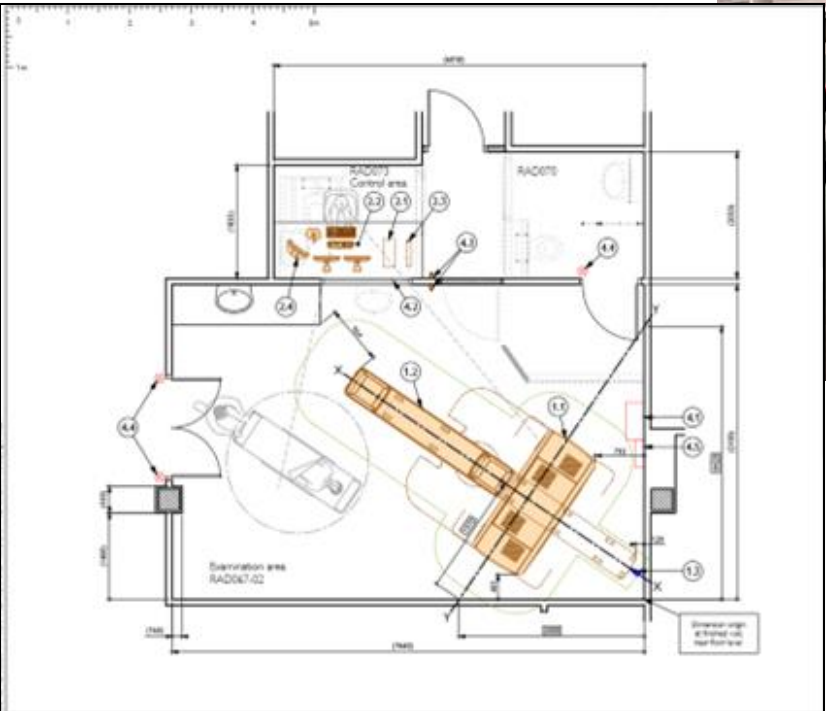
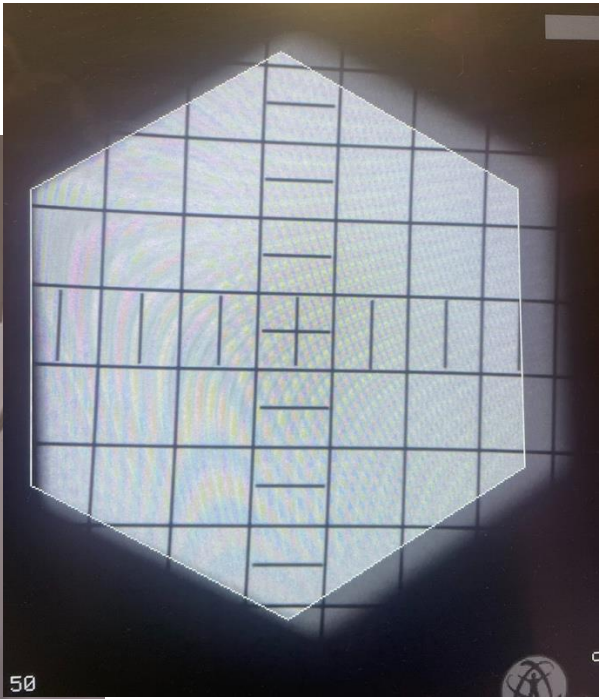
	INGEVITY MRI / INGEVITY+ Leads only	FINELINE II Leads only	Combination of one INGEVITY MRI / INGEVITY+ Lead and one FINELINE II Lead
ADVANTIO MRI Pulse Generator INGENIO MRI Pulse Generator VITALIO MRI Pulse Generator FORMIO MRI Pulse Generator	1.5 T scanner only. 3 T scanner not allowed. <i>Normal Operating Mode or First Level Controlled Operating Mode.</i>	1.5 T scanner only. 3 T scanner not allowed. <i>Normal Operating Mode only.</i>	1.5 T scanner only. 3 T scanner not allowed. <i>Normal Operating Mode only.</i>
ESSENTIO MRI Pulse Generator PROONENT MRI Pulse Generator ACCOLADE MRI Pulse Generator	1.5 T or 3 T scanner allowed. <i>Normal Operating Mode or First Level Controlled Operating Mode.</i>	1.5 T or 3 T scanner allowed. <i>Normal Operating Mode only.</i>	1.5 T or 3 T scanner allowed. <i>Normal Operating Mode only.</i>



MRI



Health Physics



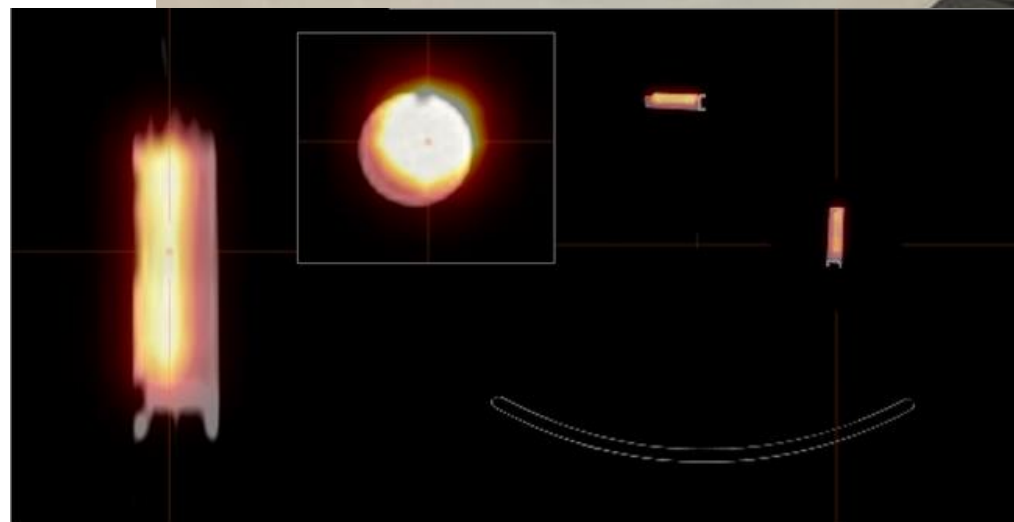
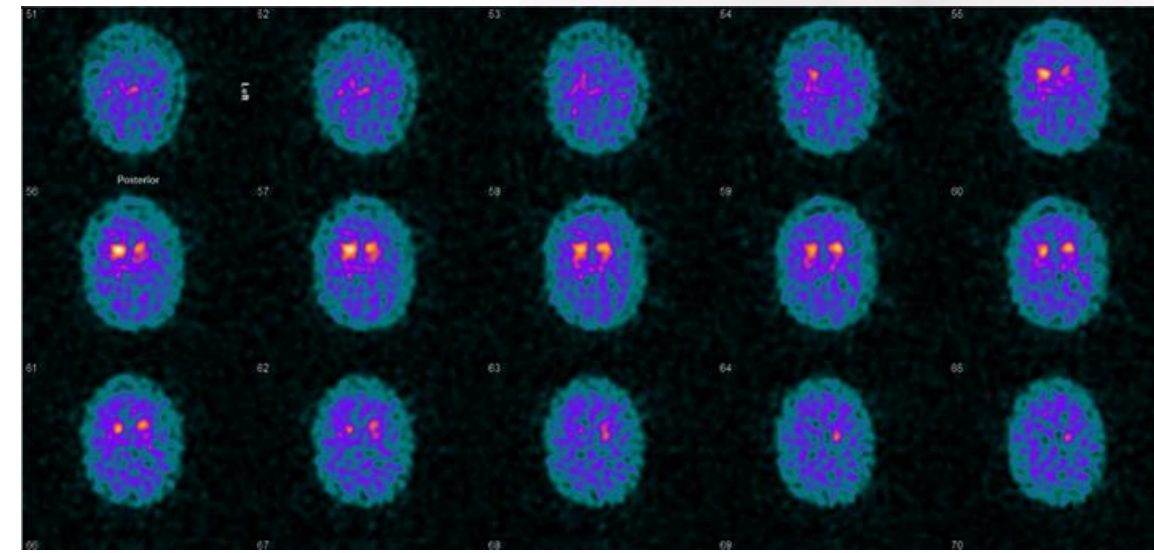
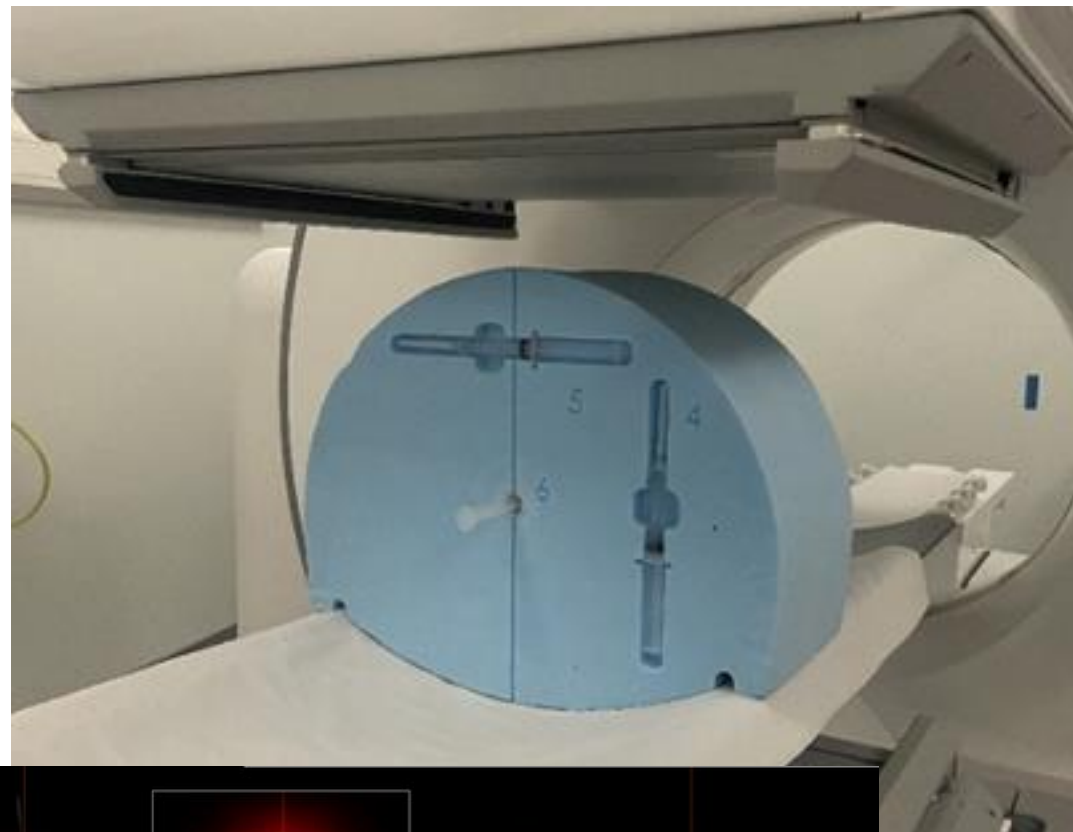
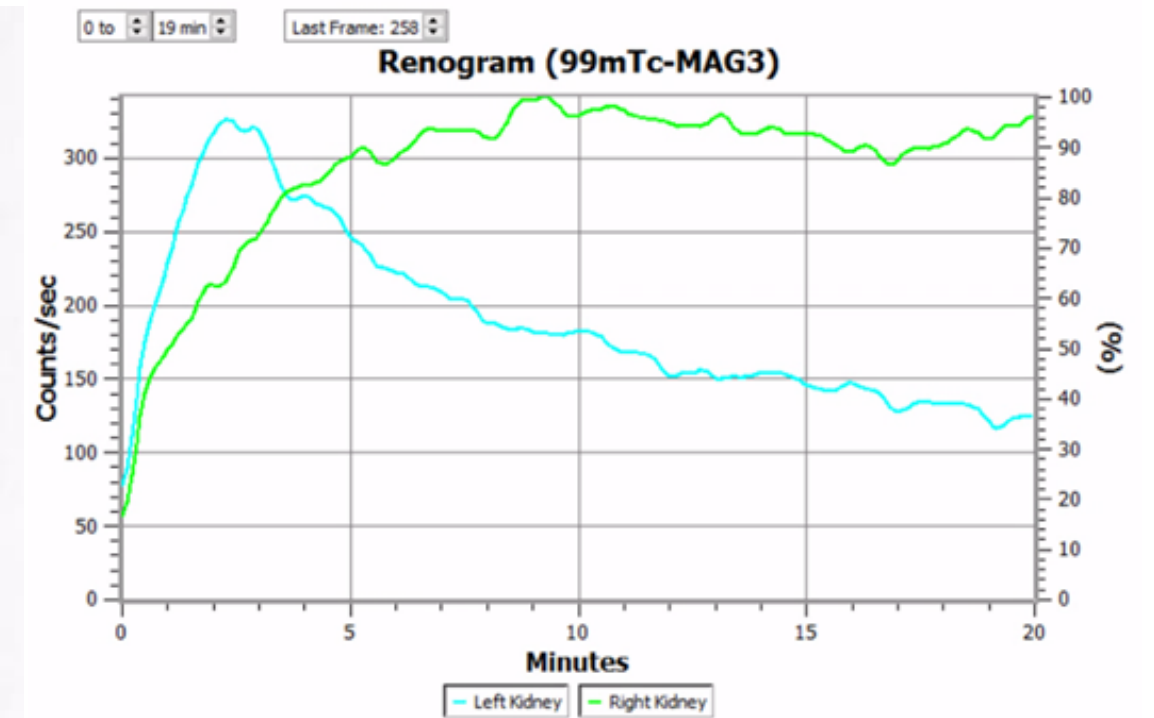
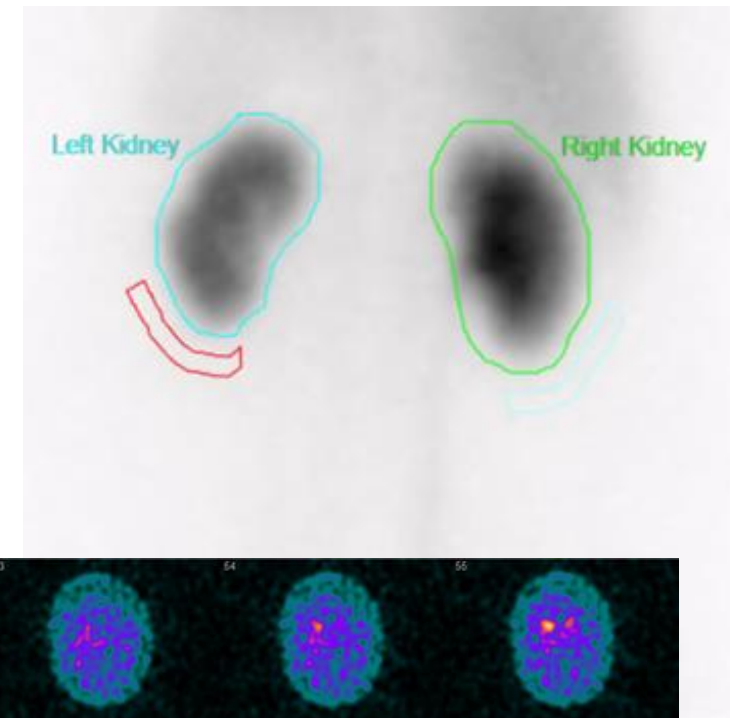
1. Summary of Results

Radiation Protection Checks	Unacceptable	See 2.1, 2.2 & 2.3
kVp Accuracy	Unacceptable	See 2.4
Timer Accuracy	Acceptable	
Total Tube Filtration	Acceptable	
Output Reproducibility	Unacceptable	See 2.5
Output Repeatability	Acceptable	
LBD Alignment	Acceptable	
AEC	Acceptable	
DAP	Acceptable	
Tube leakage	Acceptable	
DAP Calibration Factor: 1.03		

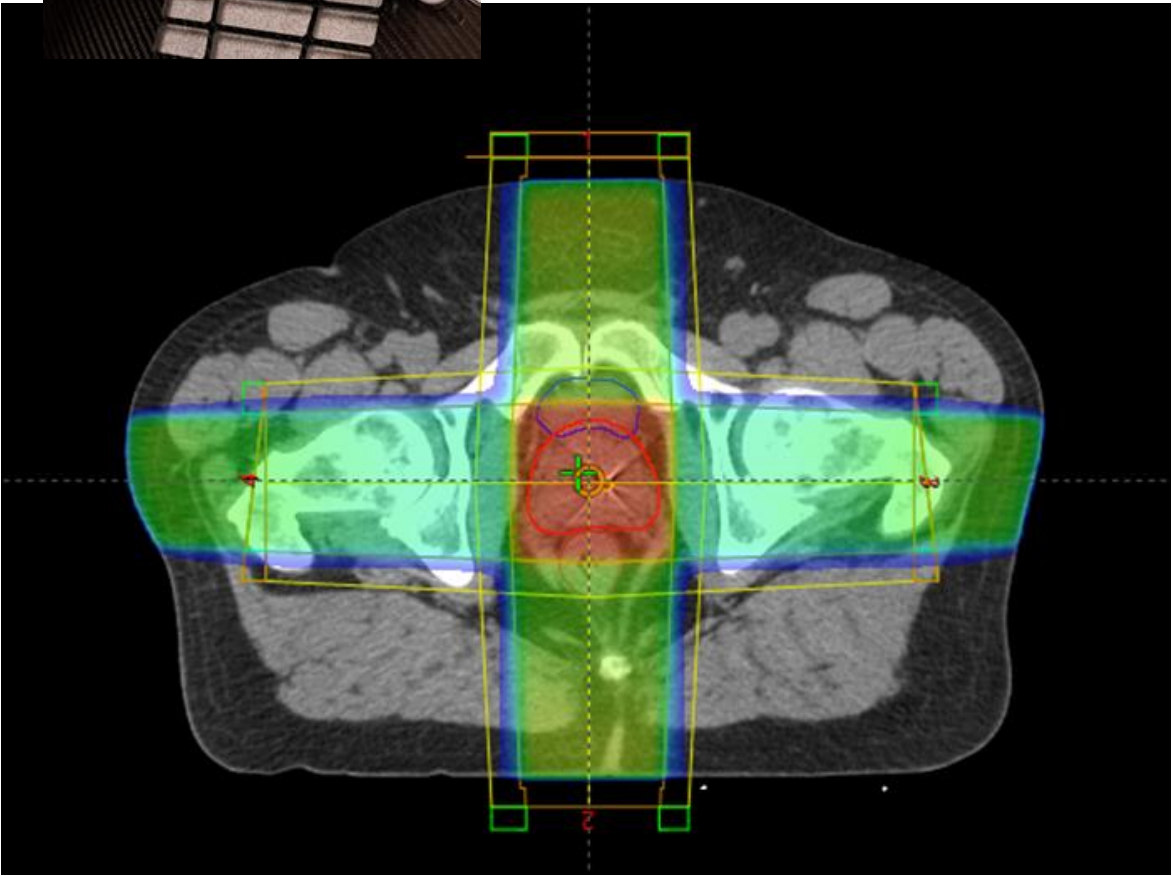
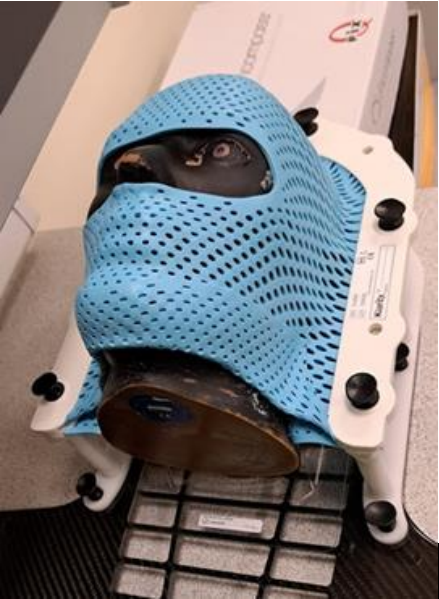
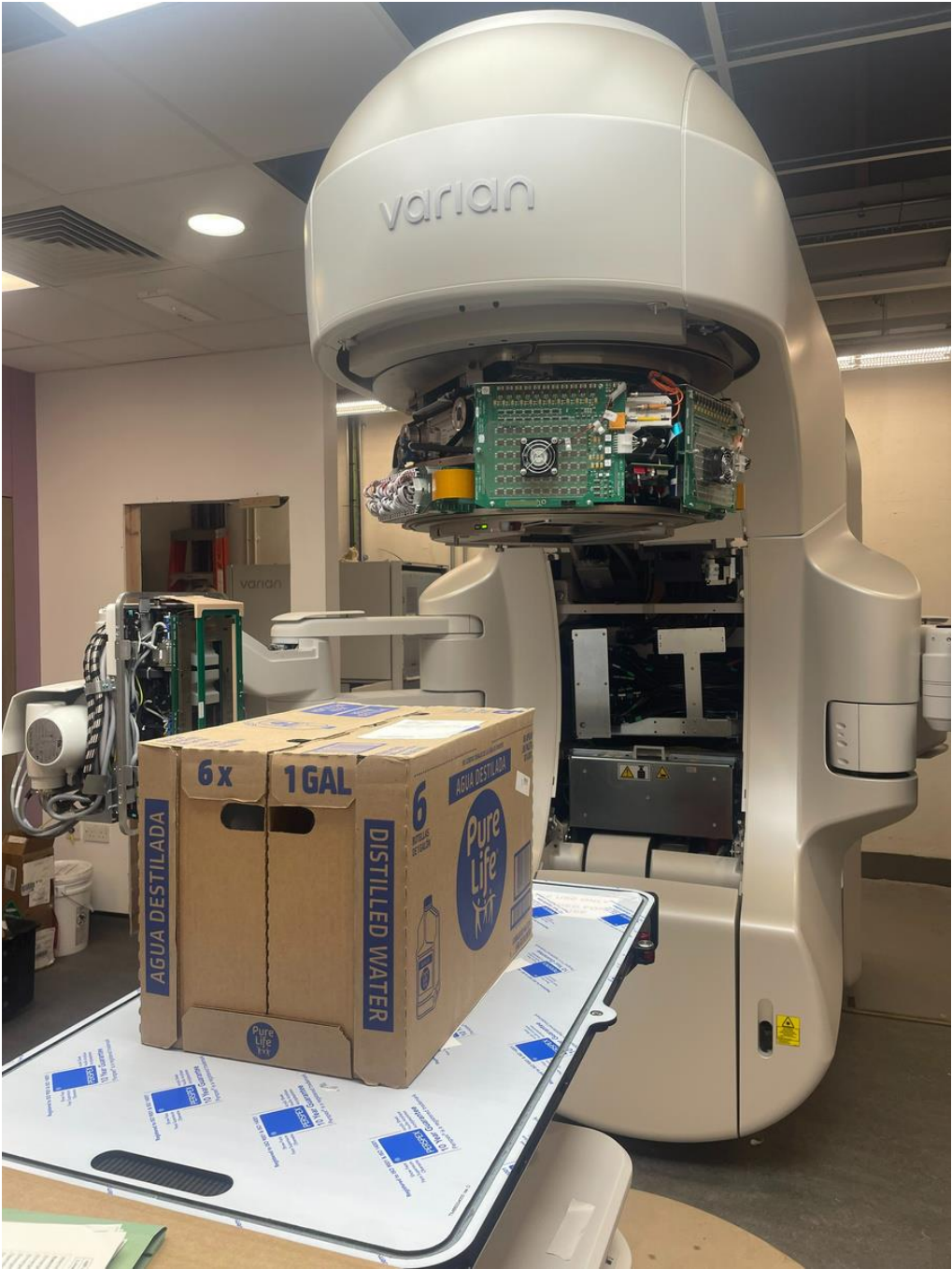
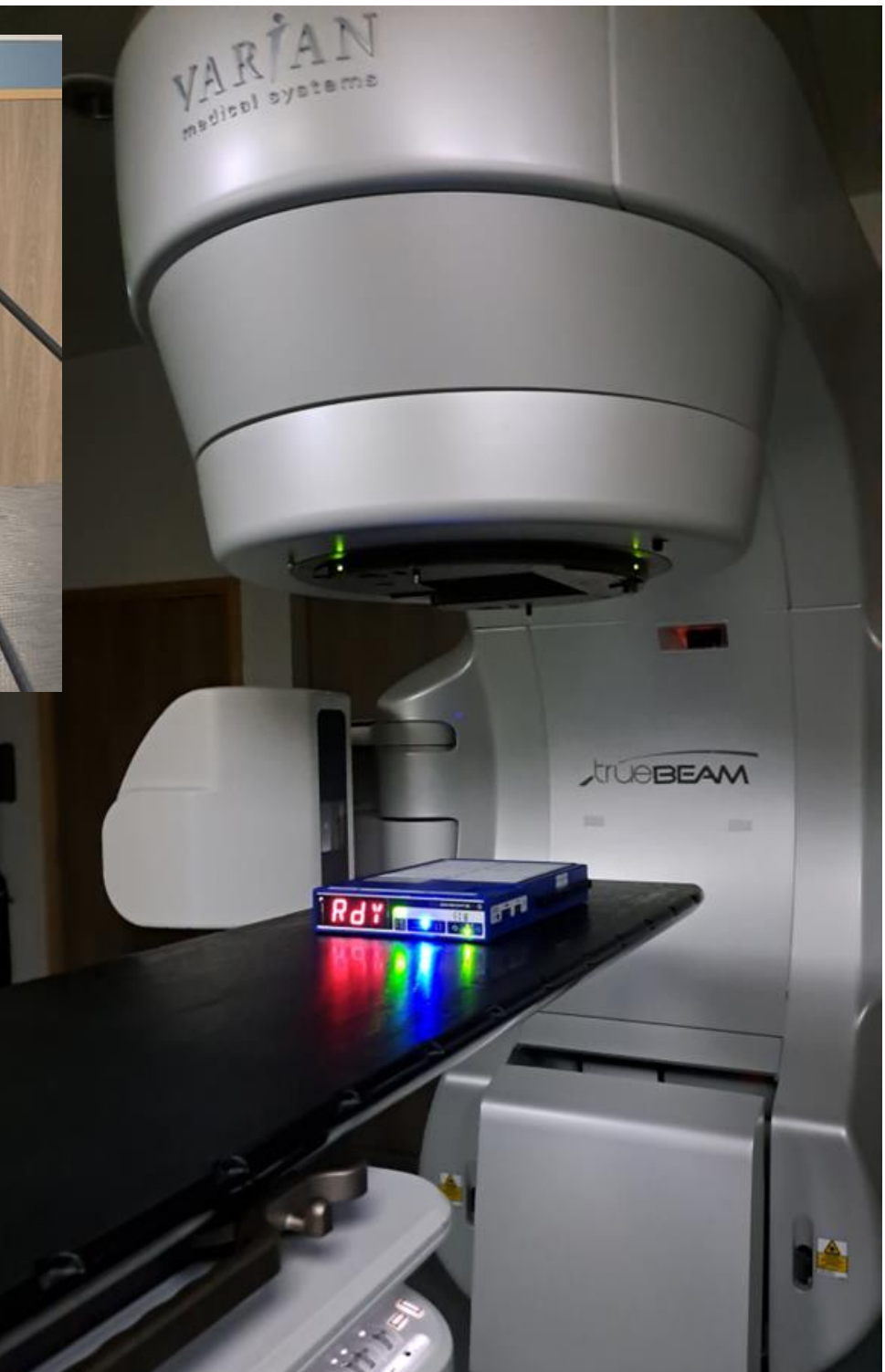
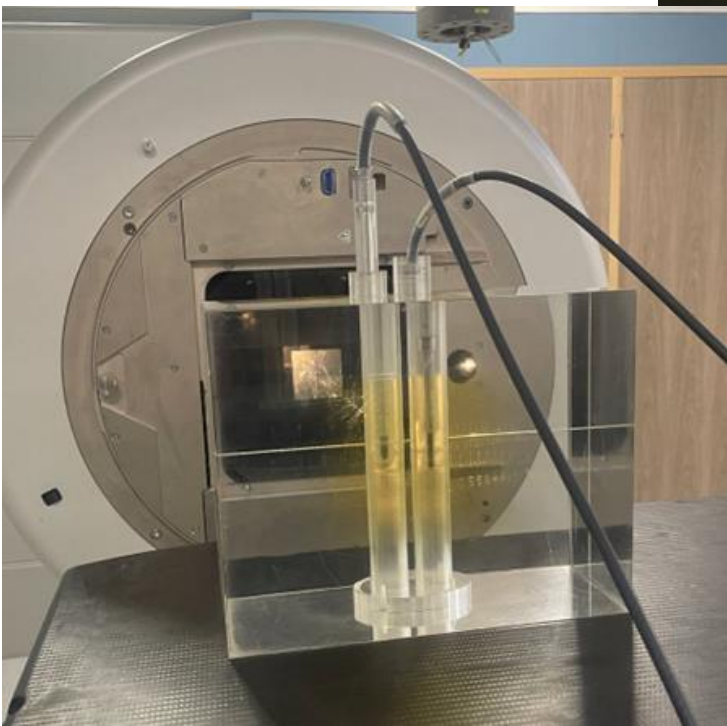
2. Conclusions & Recommendations

- Documentation (such as Local Rules, Exposure and DRL charts, standard fault log, records of staff holding patients) should be made available asap and radiographer QA needs to be established.
- Emergency Power Offs are labelled, but not to AXREM compliance. Installers are organising the additional signage required to be placed before unit is in use.
- Unauthorised use is possible through console unit, if selecting Image Plate only exposure as this bypasses the DR console.

Nuclear Medicine



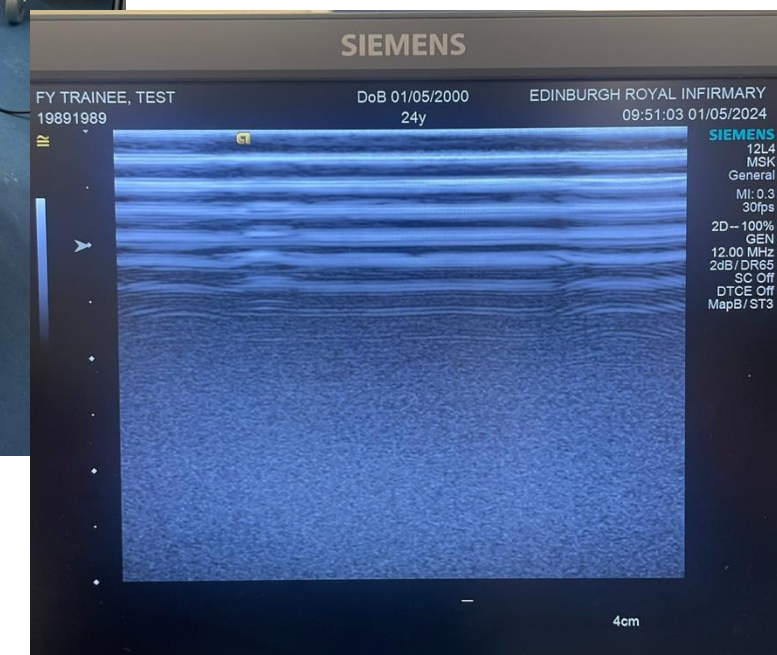
Radiotherapy



Photon Biannuals					Photon_Biannuals (Rev.221229)																		
<div>Clear</div>					<div>Load</div>																		
Date of Measurement:		27-Jun-24		Measured by:		C/LJS/CS/EB<GLC><GL		Treatment Room: Room G 17															
					Energy:		06 MV FFF Photo																
Output				PASS		Perspex Block Factor				PASS													
Dosemeter: D37				Temp: 22		°C																	
No: 5.68				Pressure: 746.3		mmHg																	
Temp: 22		°C		TPC: 1.025																			
Pressure: 746.41		mmHg		MU: 200																			
TPC: 1.025				Readings: 28.61		28.57		28.57		28.57													
%dd: 84.7		6 & 10 MV: 5cm		Px Factor: 1.203																			
MU: 200				Expected: 1.211		Difference: -0.62																	
Readings: 29.13		29.12		29.12																			
Output: 1.002		cGy/MU																					
TPR ²⁰ ₁₀				PASS		Beam Profile Analysis						PASS											
						Flatness		Symmetry		Max Difference (%)													
						X		Y		X		Y											
Readings (10 cm):				26.03		26.00		26.00		Gantry 0°:		125.26		123.85		100.31		100.82					
Readings (20 cm):				16.40		16.36		16.36		Gantry 90°:		126.05		123.84		100.20		100.81		0.69		0.36	
TPR ²⁰ ₁₀ :				0.630						Gantry 180°:		125.71		124.21		100.24		100.77		0.37		0.59	
Expected TPR ²⁰ ₁₀ :				0.624		Difference: 0.02				Gantry 270°:		125.95		123.87		100.33		100.75		0.62		0.18	
Doserate Equivalence for FFF				PASS		Comments:																	
Readings (800 MUmin ⁻¹):				28.62		28.56		28.57						Analyse four profiles									
Readings (Clinical D/R):				28.61		28.57		28.57						Save									
Ratio				1.000																			

Acquaintanceships

Rehabilitation Engineering & Ultrasound





Scottish Medical Physics Training Scheme Foundation Year Portfolio

September 2023 – September 2024



Eirin Beese

MSc in Medical Physics
BEng (Hons) in Biomedical Engineering

Department of Clinical Physics and Bioengineering
NHS Greater Glasgow and Clyde

This portfolio complies with the requirements of NHS Greater Glasgow and Clyde for patient data protection for teaching purposes. This portfolio is not in the public domain. All of the work in the portfolio is my own, except where other sources are specifically acknowledged.

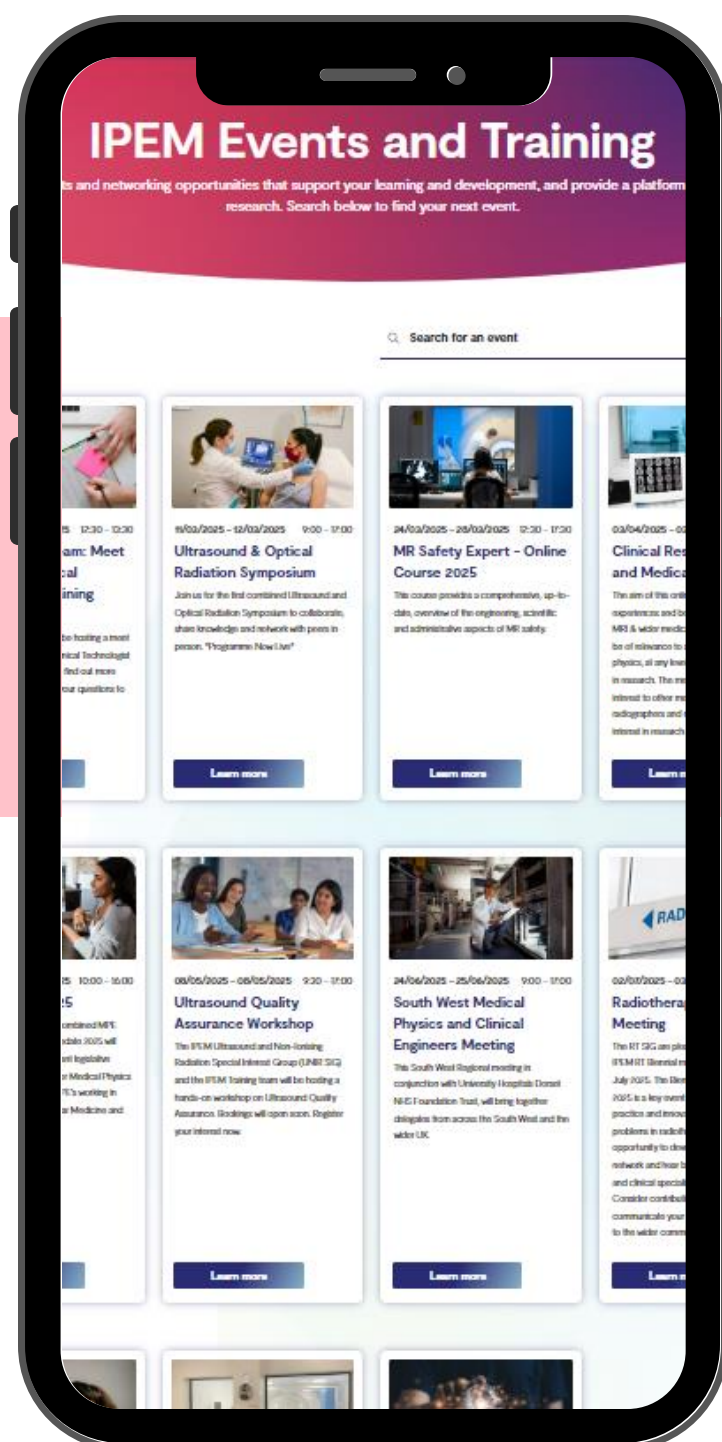
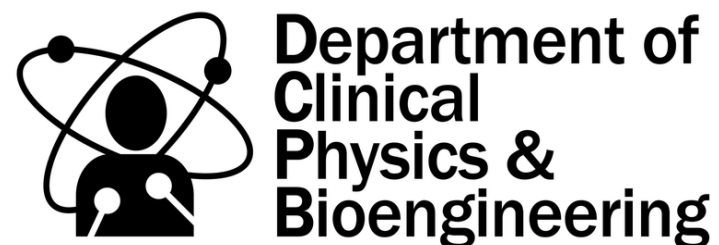
FY Portfolio

- Examples of work done throughout FY:
 - 15 pages per placement (+ Training Plan)
 - 3 pages per acquaintanceship
- LaTeX and Word templates available from Trainee Network.
 - Make sure to follow most up-to-date formatting guidance.
- “Best bits” – don’t need full write up, background, method, references etc.



Midway QA Viva

- It's a check to ensure the trainee is progressing as expected – not a pass/fail exam!
- The panel consists of 3 assessors (from the different specialisms covered in Foundation Year).
- Questions are specific to the trainee's portfolio and training plan.



Conferences



THE SOCIETY FOR
RADIOLOGICAL PROTECTION



Any questions?

Eirin Beese

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