The Oxford Clinical Neuroimaging Course Programme

This self-paced online Course covers > 30 hours of **practical aspects of adult brain MRI in the clinical setting** through a combination of lectures, 3D interactive materials, tutorials and quizzes. The **course is targeted at clinical trainees and other healthcare** professionals keen to develop their understanding of:

1. Functionally-relevant surface anatomy and white matter bundles in pathological brains
2. How imaging sequences are interpreted to reach differential diagnoses in common neurological conditions
3. Methods to acquire and analyse advanced MR images for clinical monitoring and decision-making
4. Main interventional uses of MRI, including tractography-guided, endoscopic, ultrasound-guided and awake surgery

The course includes 4 modules that can be taken independently or together for CPD credits.

Welcome Overview

- Introduction to using the virtual learning platform "Canvas"
- Instructions on installing FSL on your computer for optional data analysis tutorials
- An 'Introduction to Unix'
- Minimum course content required for continuing professional development (CPD)/continued medical education credits.

Section A: Cortical and Subcortical Brain Anatomy (Adult)

Overview of anatomy and function of the brain from the perspective of skills that are generally foremost in the clinician's mind when it comes to preserving functions during treatment: language and movement

Lectures:
- Identifying key frontal lobe Sulcal/Gyral Landmarks in MRI
- Linking Imaging and Cognition in Surgical Populations
- Introduction to Brain White Matter Fibre Tracts

Tutorials: *5 interactive 3D cortical surface models, 2 interactive 3D white matter tract models, plus clinical cases to apply this learning*

Section B: Interpreting Clinical MRI

Diagnostic interpretation in a range of common and less common conditions, focussing on those which can look alike and what to look for to reach a differential neuroradiological diagnosis

Lectures:
- Diagnostic Neuroradiology in Inflammatory and Demyelinating Conditions
- Diffusion Weighted MRI in Clinical Neuroimaging
- Diagnostic Imaging in Neuro-Oncology
- Diagnostic MRI in Epilepsy
- Good and Bad Vibrations (MR Audiometry and Elastography)
- Clinical Applications of Ultra-high field 7T MRI

Tutorial: *Expert neuroradiologists present and interpret clinical cases*

Continues overleaf…

Section C: Advanced MRI in the Clinic

The third module moves to more advanced types of MRI that generally involve some image processing (rather than visual interpretation), and their main clinical uses.

Lectures:
- Structural and Longitudinal Imaging Analysis
- Diffusion MRI in the Brain
- Introduction to MRI and fMRI – theory
- Clinical Applications of fMRI
- Arterial Spin Labelling for Non-Contrast Perfusion Imaging and Angiography
- Magnetic Resonance Spectroscopy
- Clinical Cerebro-Vascular Reactivity Mapping (CVRM)
- Fast Functional and Diffusion MRI (SMS)

Tutorials: *Guided analysis tutorials using the free software FSL to analyse provided data*
- Hippocampal Volume Analysis
- Single Subject Task fMRI for Surgical Planning
- White Matter Hyperintensity Segmentation using BIANCA
- Perfusion from ASL data
- Segmentation Based on Structural Connectivity

Section D: Image Guided Intervention

This module focusses on demonstrating MRI as it is used in daily treatment practice, with extensive clinical case presentations discussing advantages and limitations of common image-guided techniques.

Lectures:
- Awake Intraoperative Testing
- Endoscope-assisted Glioma Surgery
- Tractography-guided Glioma Surgery
- Intraoperative Ultrasound for Tumour Surgery
- Interventional Neuroradiology

Sign up will be via the University of Oxford shop. We hope to open registration in October, so please do check back on our website to sign-up. Alternatively, please feel free to indicate your interest by emailing us at win-clinmricourse@ndcn.ox.ac.uk and we will ensure you are notified once registration opens.

For questions on the course programme, please do contact us: win-clinmricourse@ndcn.ox.ac.uk