



ADN CoE[®]

NEUROIMAGE 2027

SCIENTIFIC AGENDA

Fundamentals of Neuroimaging

From Structural MRI to
Functional Brain Connectivity

ADN CoE[®] Neuroscience Academy



Live Online Programme

13 January – 3 March 2027

Every Wednesday | 20:00–21:30 GMT+3



8 Weeks



12 Educational
Hours



English



Live Online

PROGRAMME & COURSE INFORMATION

PROGRAMME AT A GLANCE

COURSE NAME	NEUROIMAGE 2027
FULL TITLE	Fundamentals of Neuroimaging
DATES	13 January - 3 March 2027
DELIVERY	Live online interactive training
SCHEDULE	Wednesdays, 20:00-21:30 (GMT+3)
DURATION	8 weeks 8 sessions 12 hours
LANGUAGE	English
ACADEMIC LEAD	Nazire Çavuş, MSc

COURSE OVERVIEW

An eight-week research-oriented introduction to structural MRI, functional MRI, diffusion imaging and brain connectivity. The programme connects neuroanatomy and imaging principles with contemporary research methodology and scientific interpretation.

IMPORTANT EDUCATIONAL NOTICE

This programme is intended for scientific and academic education. It does not confer clinical diagnostic reporting privileges, specialist credentials, or independent authorization to interpret patient imaging.

COURSE FORMAT

Expert-led lectures | Imaging demonstrations | Research discussion

LEARNING OBJECTIVES & TRAINING FORMAT

BY THE END OF THE PROGRAMME, PARTICIPANTS SHOULD BE ABLE TO:

01

Identify major cortical and subcortical structures on anatomical MRI.

02

Describe T1, T2, FLAIR and diffusion-related imaging contrasts.

03

Explain structural MRI segmentation and morphometric measurements.

04

Describe neurovascular coupling and the BOLD fMRI response.

05

Distinguish task-based from resting-state fMRI study designs.

06

Explain diffusion MRI measures and the limits of tractography.

07

Differentiate structural and functional brain connectivity.

08

Recognize major large-scale resting-state brain networks.

09

Identify common preprocessing steps, artefacts and statistical pitfalls.

10

Critically appraise a neuroimaging study and formulate a research question.

TRAINING FORMAT

Live lectures • Demonstrations • Literature review • Knowledge checks

ACADEMIC LEADERSHIP & DELIVERY

PROGRAMME DIRECTOR & LEAD INSTRUCTOR

Nazire Çavuş, MSc

Neuroscientist | Programme Director

ADN CoE® Neuroscience Academy

SCIENTIFIC TEACHING APPROACH

EXPERT-LED THEORY

Structured presentations introduce the fundamental physical, anatomical and methodological concepts behind brain imaging.

DEMONSTRATION & DISCUSSION

Guided examples connect imaging signals and brain anatomy to scientific interpretation without claiming clinical reporting training.

CRITICAL APPRAISAL

Selected publications are used to examine study design, sources of bias, reproducibility and limitations.

EDUCATIONAL ASSESSMENT

Module-based checks and a final introductory research proposal support meaningful learning and feedback.

SCIENTIFIC PROGRAMME | WEEK 01

WEEK 01

FUNCTIONAL NEUROANATOMY FOR NEUROIMAGING

WEDNESDAY 13 JANUARY 2027 | 20:00-21:30 (GMT+3)

TIME	SCIENTIFIC SESSION	FORMAT
20:00-20:15	Introduction to Neuroimaging and Anatomical Orientation Major imaging modalities, anatomical planes and image orientation.	Lecture
20:15-20:40	Cortical Organization and Functional Regions Cerebral lobes, cortical areas and systems-level organization.	Lecture
20:40-21:05	Subcortical and Limbic Structures Thalamus, basal ganglia, hippocampus and principal white matter pathways.	Lecture
21:05-21:20	Anatomical MRI Demonstration Guided identification of core structures across MRI planes.	Demonstration
21:20-21:30	Discussion and Knowledge Check Functional-anatomical integration and participant questions.	Discussion

LEARNING OBJECTIVE

Identify major anatomical structures on brain MRI and relate their location to functional systems.

SCIENTIFIC PROGRAMME | WEEK 02

WEEK 02

MRI PHYSICS & IMAGING SEQUENCES

WEDNESDAY 20 JANUARY 2027 | 20:00-21:30 (GMT+3)

TIME	SCIENTIFIC SESSION	FORMAT
20:00-20:20	Core Principles of Magnetic Resonance Spin, precession, relaxation and MR signal formation.	Lecture
20:20-20:45	Common Brain Imaging Sequences T1, T2, FLAIR, DWI/ADC and susceptibility-sensitive methods.	Lecture
20:45-21:05	Acquisition Parameters and Artefacts Resolution, timing, motion and basic image quality considerations.	Lecture
21:05-21:20	Sequence Comparison and MR Safety Comparative contrast demonstration and introductory safety principles.	Demonstration
21:20-21:30	Discussion and Knowledge Check Interpret sequence selection in research contexts.	Discussion

LEARNING OBJECTIVE

Explain basic MR signal formation and distinguish major structural imaging sequences.

SCIENTIFIC PROGRAMME | WEEK 03

WEEK 03

STRUCTURAL MRI & BRAIN MORPHOMETRY

WEDNESDAY 27 JANUARY 2027 | 20:00-21:30 (GMT+3)

TIME	SCIENTIFIC SESSION	FORMAT
20:00-20:20	High-Resolution Structural MRI Anatomical acquisitions and research use cases.	Lecture
20:20-20:45	Segmentation and Brain Morphometry Gray/white matter, volumetry and cortical thickness.	Lecture
20:45-21:05	Atlases, Registration and Normalization Common coordinate systems, anatomical labels and alignment.	Lecture
21:05-21:20	Structural Research Demonstration Illustrative segmentation and volumetric outputs.	Demonstration
21:20-21:30	Discussion and Knowledge Check Confounds, variability and interpretation.	Discussion
LEARNING OBJECTIVE Describe core structural MRI analysis methods and their principal limitations.		

SCIENTIFIC PROGRAMME | WEEK 04

WEEK 04

FUNCTIONAL MRI & BOLD SIGNAL

WEDNESDAY 3 FEBRUARY 2027 | 20:00-21:30 (GMT+3)

TIME	SCIENTIFIC SESSION	FORMAT
20:00-20:20	Neurovascular Coupling Physiological origins and limitations of the BOLD response.	Lecture
20:20-20:45	BOLD Contrast and Hemodynamics T2*-weighted sensitivity and hemodynamic response functions.	Lecture
20:45-21:05	Task-Based and Resting-State Designs Experimental paradigms, contrasts and interpretation.	Lecture
21:05-21:20	Functional Imaging Demonstration Activation maps, time courses and design considerations.	Demonstration
21:20-21:30	Discussion and Knowledge Check Physiological and inferential limitations.	Discussion

LEARNING OBJECTIVE

Explain BOLD physiology and distinguish task-based and resting-state fMRI applications.

SCIENTIFIC PROGRAMME | WEEK 05

WEEK 05

DIFFUSION MRI & STRUCTURAL CONNECTIVITY

WEDNESDAY 10 FEBRUARY 2027 | 20:00-21:30 (GMT+3)

TIME	SCIENTIFIC SESSION	FORMAT
20:00-20:20	Diffusion-Weighted Imaging Principles Water diffusion, directional sensitivity and signal contrast.	Lecture
20:20-20:45	Diffusion Tensor Imaging Measures Tensor modelling, fractional anisotropy and mean diffusivity.	Lecture
20:45-21:05	Tractography and Structural Networks Reconstruction principles and false-positive pathways.	Lecture
21:05-21:20	Diffusion Research Demonstration Tensor maps and illustrative white matter tracts.	Demonstration
21:20-21:30	Discussion and Knowledge Check Interpretive limitations and methodological choices.	Discussion

LEARNING OBJECTIVE

Describe diffusion-derived indices and critically evaluate tractography claims.

SCIENTIFIC PROGRAMME | WEEK 06

WEEK 06

FUNCTIONAL CONNECTIVITY & BRAIN NETWORKS

WEDNESDAY 17 FEBRUARY 2027 | 20:00-21:30 (GMT+3)

TIME	SCIENTIFIC SESSION	FORMAT
20:00-20:20	Introduction to Functional Connectivity Temporal association, time-series correlation and confounding.	Lecture
20:20-20:45	Resting-State Brain Networks Intrinsic organization and methodological considerations.	Lecture
20:45-21:05	Major Large-Scale Brain Systems Default mode, salience and executive control networks.	Lecture
21:05-21:20	Connectivity Matrix Demonstration Seed-based maps, matrices and elementary network graphs.	Demonstration
21:20-21:30	Discussion and Knowledge Check Association, directionality and causality.	Discussion

LEARNING OBJECTIVE

Interpret basic connectivity outputs and distinguish association from causal connectivity.

SCIENTIFIC PROGRAMME | WEEK 07

WEEK 07

NEUROIMAGING DATA PROCESSING & RESEARCH METHODS

WEDNESDAY 24 FEBRUARY 2027 | 20:00-21:30 (GMT+3)

TIME	SCIENTIFIC SESSION	FORMAT
20:00-20:20	Neuroimaging Data Organization BIDS conventions and data provenance.	Lecture
20:20-20:45	Preprocessing and Quality Control Motion correction, registration, normalization and artefacts.	Lecture
20:45-21:05	Statistical Modelling and Inference Design matrices, multiple comparisons and reproducibility.	Lecture
21:05-21:20	Software and Open-Data Demonstration Illustrative research workflows and open neuroimaging resources.	Demonstration
21:20-21:30	Discussion and Knowledge Check Quality assurance and robust interpretation.	Discussion

LEARNING OBJECTIVE

Outline the main preprocessing and statistical stages of a reproducible neuroimaging study.

SCIENTIFIC PROGRAMME | WEEK 08

WEEK 08

RESEARCH DESIGN & FINAL ASSESSMENT

WEDNESDAY 3 MARCH 2027 | 20:00-21:30 (GMT+3)

TIME	SCIENTIFIC SESSION	FORMAT
20:00-20:20	Developing a Research Question Hypothesis formation and links to neuroimaging measures.	Lecture
20:20-20:40	Study Design, Ethics and Bias Sample-size logic, confounding, participant protection and feasibility.	Lecture
20:40-21:00	Critical Appraisal of Published Studies Methodological quality, limitations and evidence interpretation.	Workshop
21:00-21:20	Mini Research Proposal and Assessment Participant research concepts and final knowledge assessment.	Assessment
21:20-21:30	Faculty Feedback and Closing Key takeaways, course evaluation and next steps.	Discussion

LEARNING OBJECTIVE

Formulate an introductory neuroimaging research plan and critically evaluate methodological quality.

PARTICIPANT INFORMATION & CERTIFICATION

EDUCATIONAL FORMAT

Eight scheduled live online sessions. Participants are expected to attend at the published times and participate in discussions and required assessments.

ATTENDANCE & ASSESSMENT

Proposed eligibility for the Certificate of Completion requires at least 75% live attendance and satisfactory completion of mandatory assessments. Final assessment thresholds must be issued before enrolment.

MATERIALS & REPLAY ACCESS

Programme resources may be shared through authorized channels. Routine recording of live sessions and replay access are not guaranteed.

EDUCATIONAL SCOPE

Scientific imaging demonstrations and analysis exercises are for academic and research education, not patient care or independent clinical reporting.

CERTIFICATION & ACCREDITATION

Eligible participants receive an ADN CoE[®] Certificate of Completion. External CME/CPD or university accreditation has not been approved or claimed.

ADMINISTRATIVE CONTACT

All registration and programme enquiries should be addressed through official ADN CoE[®] communication channels.

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