

CARDIFF

Institutions

Cardiff University Brain Research Imaging Centre (CUBRIC) is a purpose-built multi-modal neuroimaging facility newly expanded and re-opened in 2016. CUBRIC is supported by Cardiff University, UK Medical Research Council, UK Engineering and Physical Sciences Research Council, Wellcome Trust, EU and the Wolfsan Foundation. CUBRIC is allied to Cardiff University's Neuroscience and Mental Health Research Institute, incorporating expertise in the genetics of dementias, and to the Dementias Platform UK (DPUK). Cardiff is a member of the UK7T network.

Principal Investigators



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7T equipment

Hardware Siemens Magnetom-research-only neuro-focussed (32ch head coils: single and parallel transmission, ^{23}Na and ^{31}P head coils, field camera)

Operational since 2016

Other equipment (human imaging): 2 x 3T MR (Siemens Prisma)*, 3T MR (Siemens Connectom with 300 mT/m whole body gradients)*, 275 channel Magnetoencephalography*, Electroencephalography*, Brain stimulation labs* (TMS and tDCS), nearby PET system at PETIC including human PET (joint clinical and research), micro PET and full cyclotron facilities with radiochemistry.

* = research only

7T Methods (as relevant for EUFIND)

Acquisition

- High resolution EPI (sub mill. task and resting fMRI)
- QSM
- Susceptibility weighted imaging
- Development of 7T ASL
- TOF Imaging
- TI weighted imaging
- MR Spectroscopy (^1H and ^{31}P)
- Sodium imaging
- Respiratory challenges (hyper/hypocapnia, hyper/hypoxia) for quantitative fMRI

Analysis

Development of brain segmentation protocols
 Segmentation of MTL structures
 Task-based hi-res functional parcellation of MTL
 Visualisation of veins based on SWI and modulation of venous oxygenation e.g. breath-hold
 Arterial compliance assessment
 Assessment of venous oxygenation (and OEF) from SWI (phase)
 CBV and CBF modeling from BOLD and ASL data
 BOLD signal modeling for mapping OEF and CMRO₂

Research in neurodegeneration

Clinical and basic research topics

- Development of imaging methods (MRI, MEG)
- Studies of PD including neurofeedback
- Studies of genetic and environmental risk factors for dementia in early life
- Functional imaging of cognitive circuits

Cohorts

Healthy young and older controls
 Links with ALSPAC (young cohort)
 Access to local patients cohorts including AD and early onset AD
 HD & PD local recruitment

Ethics Procedures

Approval for methods development in place. Specific questions and patients require additional ethics.