

Brain Mapping Unit



UNIVERSITY OF
CAMBRIDGE

Department of Psychiatry

*Sir William Hardy Building
Opening Ceremony*

8 April 2005

Foreword

It is a great pleasure to have new lab space for the BMU in the refurbished Sir William Hardy Building.

This is key to our growing links with the Dept of Experimental Psychology and other groups in the MRC BCNC.

Many thanks to SRIF2 for funding and to Cheryl Tetlow-Noell for organization.

-- Prof Ed Bullmore



Refurbished BMU Lab Space



We do two types of complementary neuroimaging research...

FMRI studies of psychiatric and psychological Issues

- Memory, reward learning.
- Drug effects on brain systems.
- Abnormalities of brain function in schizophrenia, autism, mood disorder etc.

Computerized algorithms for analysis of (f)MRI data

- Wavelet methods for time series and spatial process analysis.
- Permutation tests.
- Small-world and graph theoretical network analysis.
- Software engineering and dissemination.

In the next few slides ...

FMRI studies of psychiatric and psychological Issues

- Memory, reward learning.
- Drug effects on brain systems.
- Abnormalities of brain function in schizophrenia, autism, mood disorder etc.

Note: Project slides are randomized and listing inside the “Project Summary Box” does not follow any order.

Longitudinal fMRI study of Mania

This study aims to establish how closely facial emotion recognition and its associated functional anatomy are associated with the manic and depressed mood state, whether they have any potential as markers for bipolar disorder.

Principal Investigator:

Belinda Lennox

Collaborators:

Ed Bullmore

Andy Calder (CBU)

MRI Center:

WBIC

Funding:

NARSAD, USA

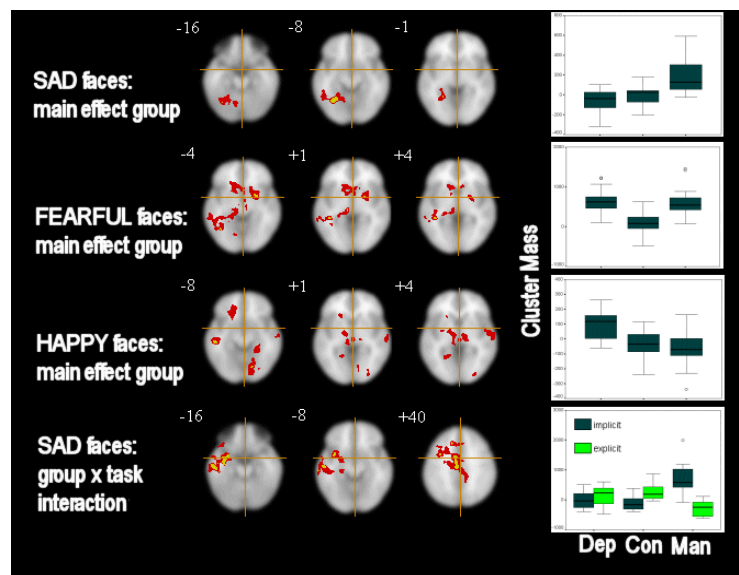
Status:

Acquiring Data

Study of emotional processing in Mania using fMRI

This study investigates the behavioral and neurocognitive correlates of facial affect recognition in patients with mania.

Conclusion: manic patients demonstrate a specific negative bias towards sad faces and have a different profile of brain activation.



Principal Investigator:

Belinda Lennox
Chi-Hua Chen

Collaborators:

Ed Bullmore
Rebecca Jacobs
Andy Calder (CBU)

MRI Center:

WBIC

Funding:

NARSAD, USA

Status:

One publication,
another pending

The neural substrates of compassion fatigue and Its modulation by depressed mood

This project studies the habituation to emotive stimuli in healthy volunteers and depressed patients across different time-scales using dynamical representation of morphed faces.



Principal Investigator:

Dina Kronhaus

Collaborators:

Ed Bullmore

Chi-Hua Chen

MRI Center:

WBIC

Funding:

Pinsent-Darwin

Fund

Status:

Experiment

under

construction

Antidepressant drug effects on brain systems for affect recognition in patients with depression

To apply multivariate methods to characterize functional and effective connectivities of the components of emotional brain circuits.

Principal Investigator:

Chi-Hua Chen

Collaborators:

Ed Bullmore

John Suckling

MRI Center:

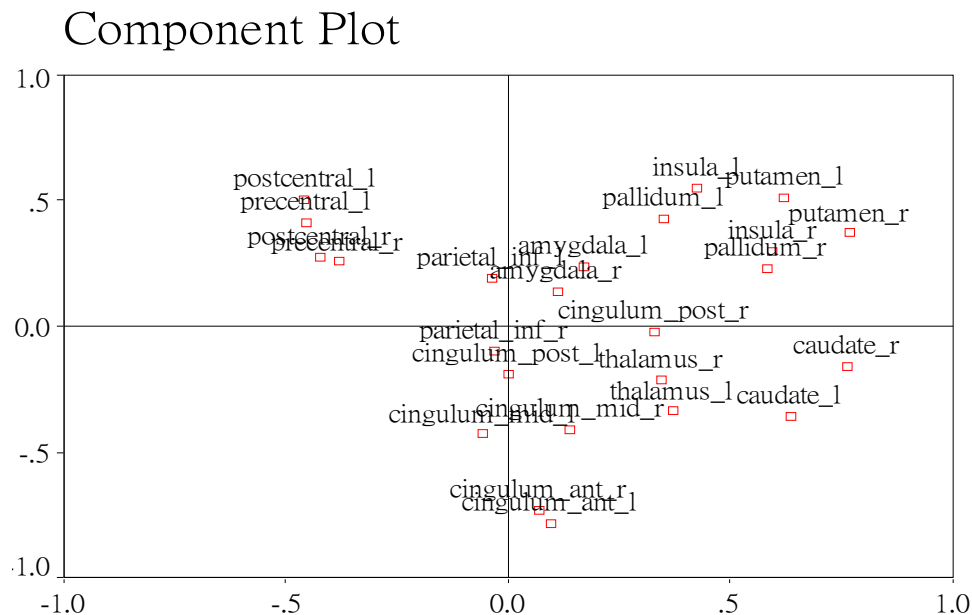
Institute of
Psychiatry

Funding:

GSK

Status:

Data Analysis



Neurocognitive function in adolescents depressed during school age years

Focusing on investigation on emotion recognition and episodic memory and their neural substrates which may be impaired by exposure to high levels of glucocorticoids over time.

This will be achieved through neurocognitive, fMRI, MRI and endocrine assessment.

Principal Investigator:
Ruth Hewson

Collaborators:
Ian Goodyer
Paul Fletcher

MRI Center:
WBIC

Status:
Data collected.
Analyzing

Learning and memory in Psychosis and Mild Cognition Impairment

To understand more clearly the neurobiological basis of impaired memory function in people diagnosed with certain symptoms of mental illness.



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
National Institutes of Health

Principal Investigator:
Sergio Arana

Collaborator:
Paul Fletcher

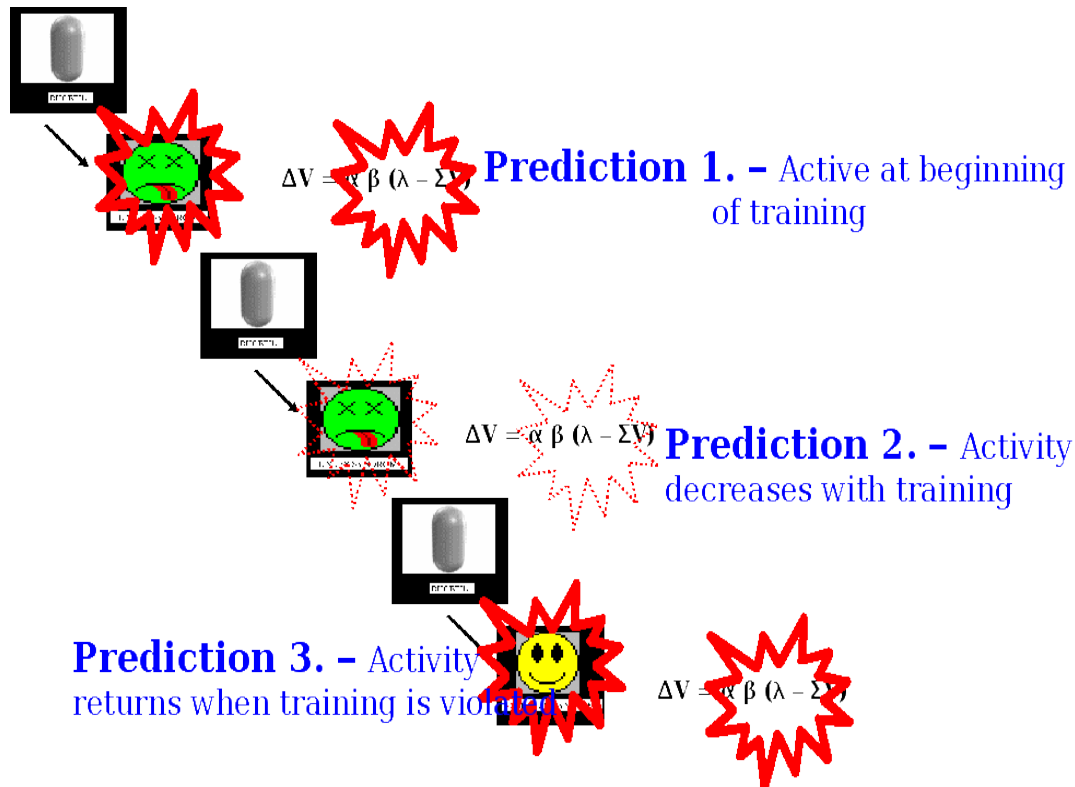
MRI Center:
WBIC

Funding:
NIH-Cambridge
Studentship

Status:
Pilot Project

FMRI and brain mechanisms of causal learning

Using fMRI to tell us something about human causal learning (predictive learning).



Principal Investigator:
Phil Corlett

Collaborator:
Paul Fletcher

MRI Center:
WBIC

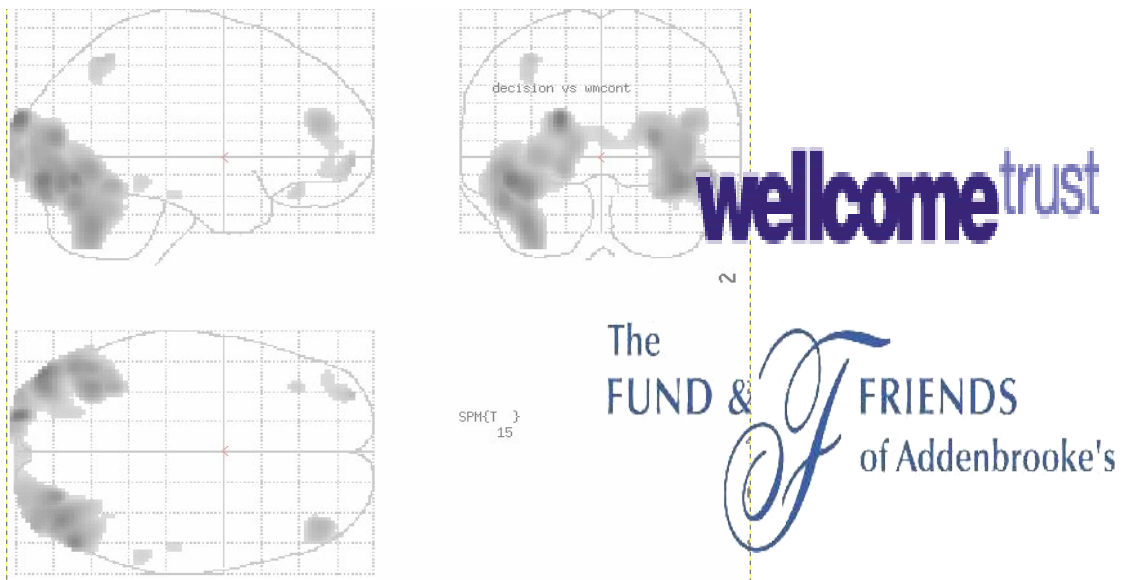
Funding:
Welcome Trust

Status:
Near Completion

welcome trust

The effects of substance misuse on decision-making – Neuroimaging and neuropsychological studies

Neuropsychological correlates and neuro-chemical mechanisms underlying impulsive behaviour patterns, including risky decision-making in current and former amphetamine and opiate dependent individuals.



Principal Investigator:
Karen Ersche

Collaborators:
Barbara Sahakian
Trevor Robbins
Paul Fletcher

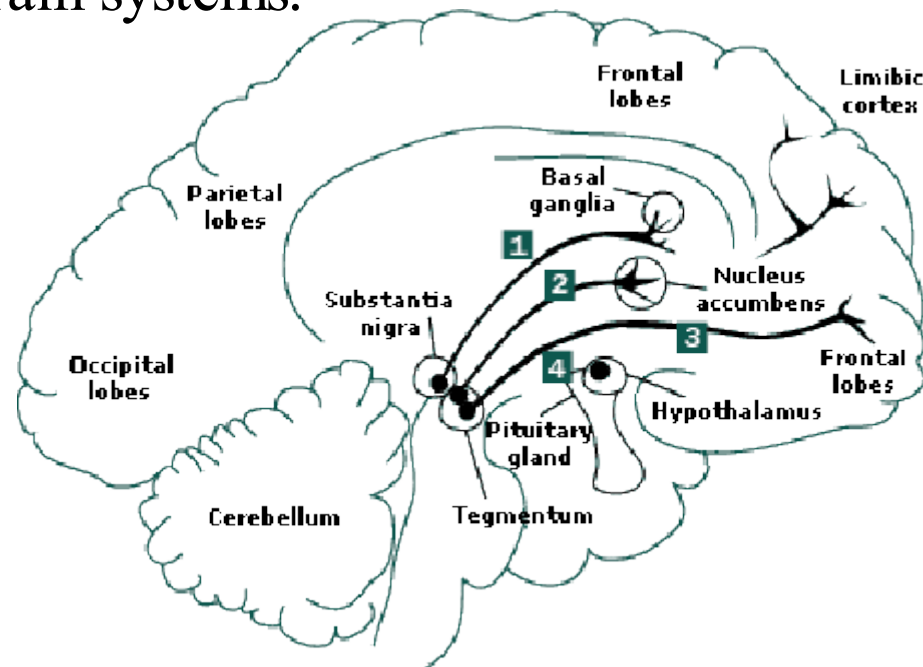
Funding:
Wellcome Trust
The Fund for
Addenbrooke's

Status:
Data analysis.

Publications:
4 Publications

Prefrontal processes in age-related memory decline: Role of Dopamine Systems

Using fMRI and behavioural methods, this psychopharmacological study investigate how ageing effect of memory is affected by ageing effect of dopamine-dependent brain systems.



Principal Investigator:
Alexa Morcom

Collaborators:
Paul Fletcher
Ed Bullmore
Belinda Lennox
etc.

Funding:
Help the Aged

Status:
First stage completed.

Research into Ageing

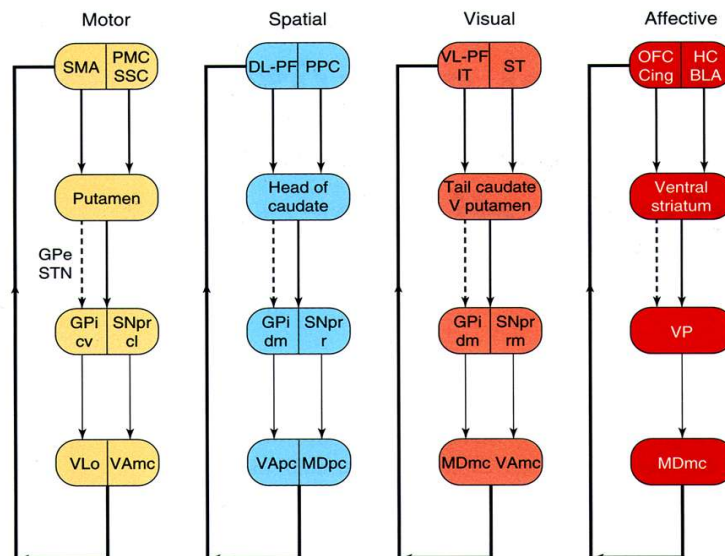


Help the Aged

Integrative cognitive, neuroimaging and genetic studies of Obsessive-Compulsive Disorder

To find the relationship between MR data and genes of OCD patients.

Structural MR data, genotype profile and cognitive assessment data will be collected from OCD patients and compared with that of their first degree relative.



Principal Investigator:

Lara Menzies
Sam Chamberlain

Collaborators:

Ed Bullmore
Barbara Sahakian
Trevor Robbins
Naomi Fineberg

Funding:

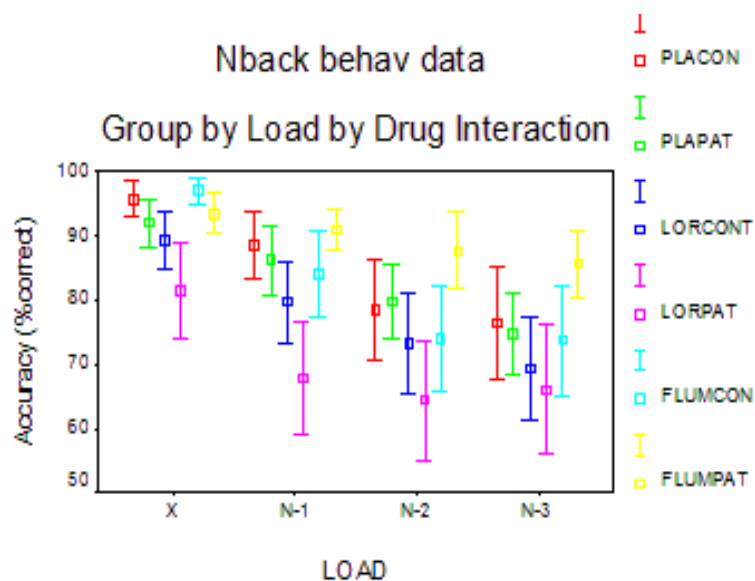
Merck, Sharp and
Dohme MB/PhD
Studentship

Status:

About to start MRI
and genetic data
collection.

The effect of GABAergic manipulation on working memory of Schizophrenic patients

This study aims to find the physiological correlates of behavioural data indicating that schizophrenics and healthy volunteers have different profiles of cognitive impairment/enhancement following treatment with GABAergic drugs.



Principal Investigator:
Lara Menzies

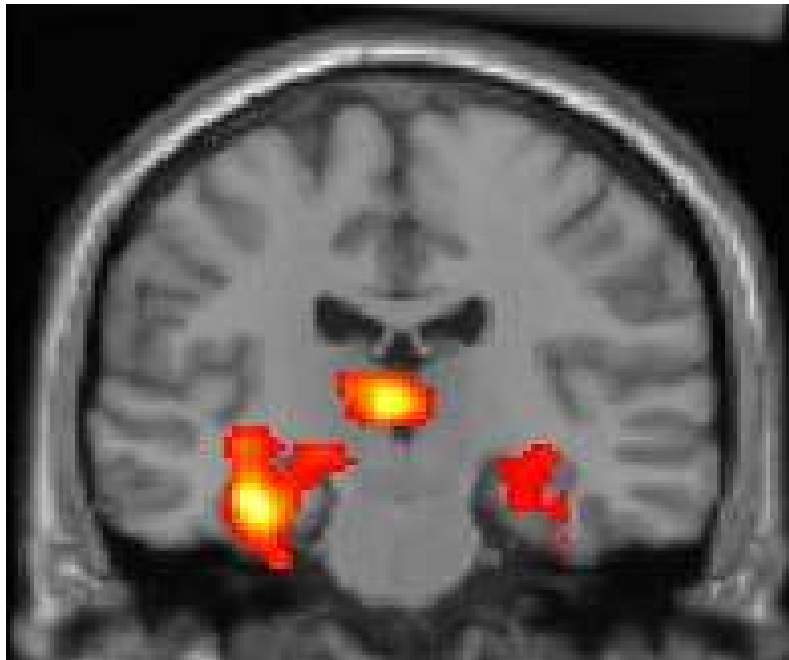
Collaborators:
Ed Bullmore
John Suckling
Caroline Stephenson
Cinly Ooi

Funding:
Wellcome Trust
MSD MD/PhD
Studentship

Status:
Data collection
completed.
Analyzing data.

Functional MRI studies of memory, ageing and cholinergic drugs

Using fMRI to investigate the relationships between memory, ageing and acetylcholine.



Principal Investigator:
Frederic Bernard

Collaborators:
Ed Bullmore
Paul Fletcher

Funding:
Merck, Sharp &
Dohme
NIH Human Brain
Project

Status:
Analyzing data.



In the next few slides ...

FMRI studies of psychiatric and psychological Issues

- Memory, reward learning.
- Drug effects on brain systems.
- Abnormalities of brain function in schizophrenia, autism, mood disorder etc.

Note: Project slides are randomized and listing inside the “Project Summary Box” does not follow any order.

Wavelets, fractal and fMRI of brain adaptivity

Develop new wavelet-based statistical approaches for fMRI data analysis in order to identify activated regions of brain while addressing the following issues: power, multidimensional representation (2D,3D orthogonal and complex wavelet transforms), computational complexity, noise characteristic.

Principal Investigator:
Levent Sendur

Collaborator:
Ed Bullmore

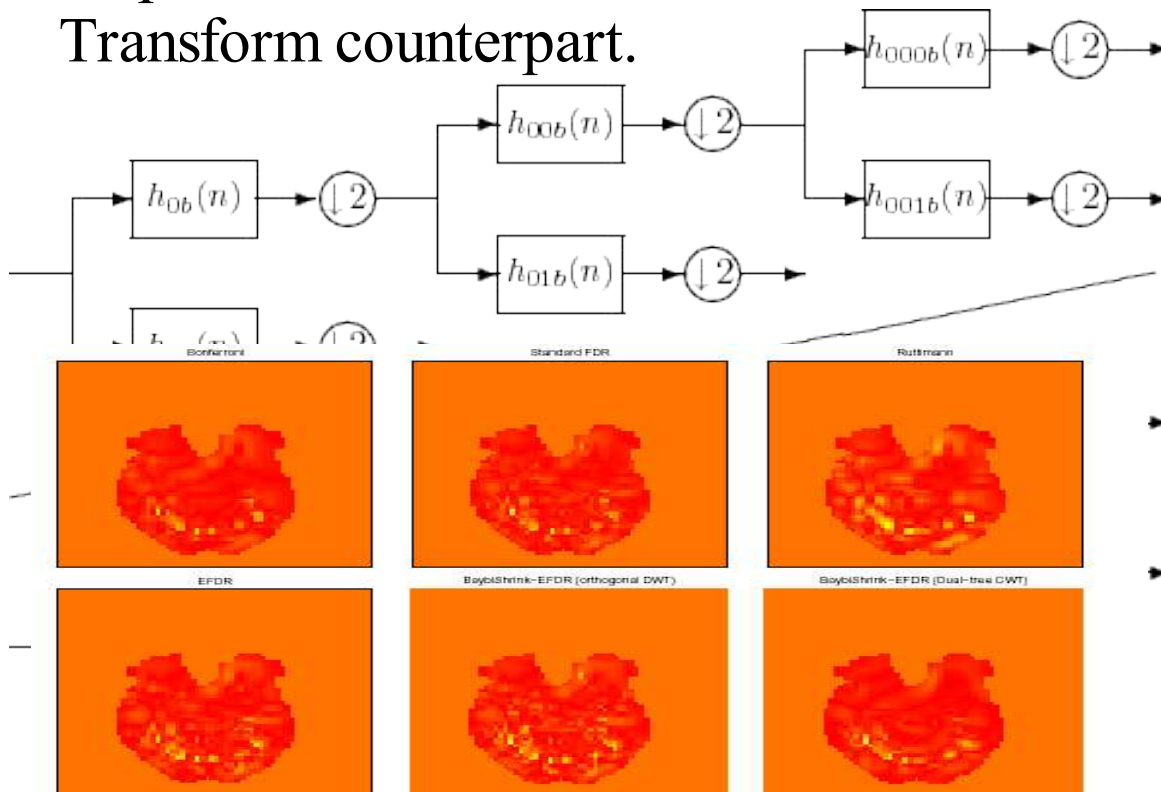
Funding:
NIH Human Brain Project

Status:
On going



Testing of statistical brain maps with dual-tree complex wavelets transform

We developed algorithms based on dual-tree complex wavelets transform that outperforms its standard Discrete Wavelet Transform counterpart.



Principal Investigator:
Levent Sendur

Collaborator:
John Suckling
Ed Bullmore

Funding:
NIH Human Brain
Project

Status:
Completed



Fractal analysis shows increased persistence low frequency dynamics in Alzheimer's Disease

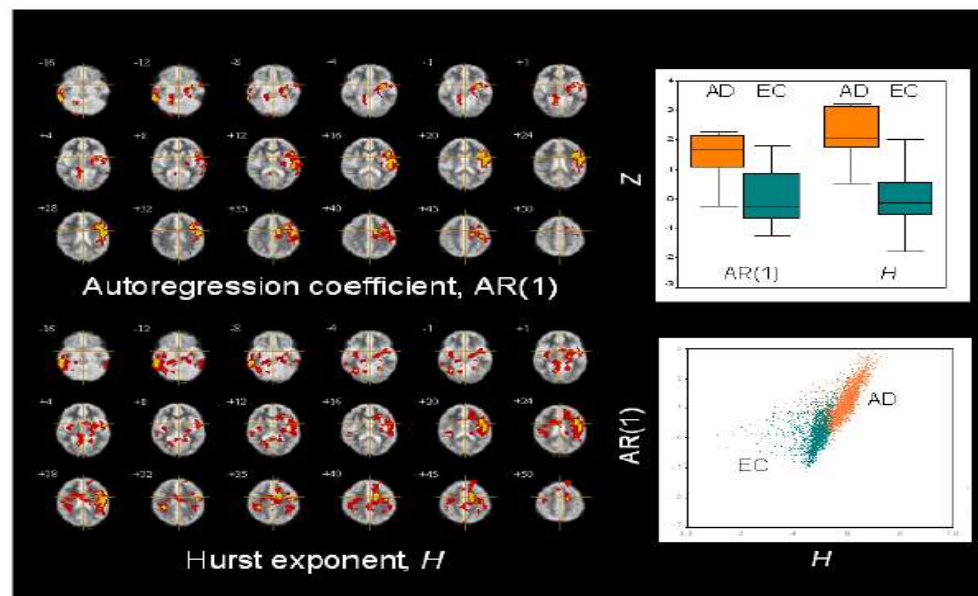
Theory suggests that aging and degenerative disorders are associated with reduced physiological complexity. This study collaborates this by showing that Alzheimer's sufferers have increased persistence of low frequency dynamics when they are at rest.

Principal Investigator:
Voichita Maxim

Collaborator:
Ed Bullmore

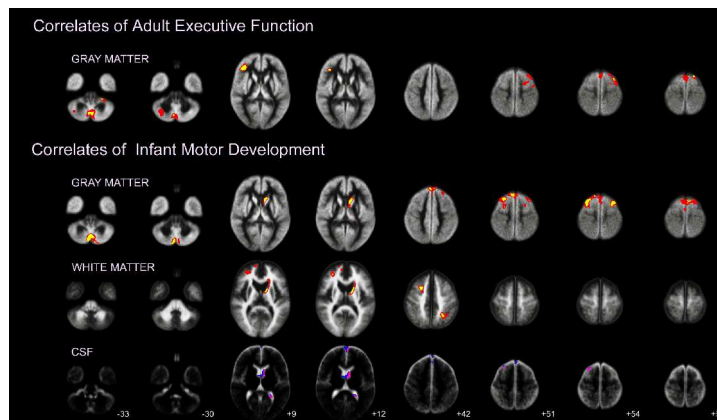
Funding:
NIH Human Brain Project

Status:
Completed



Correlation of infant motor skills and adult executive function in patients with Schizophrenia

This study of brain structure of birth cohort in Northern Finland shows that the age at which an infant learn to stand and walk predicts adult premotor cortical grey matter volume in healthy volunteers but not for Schizophrenia sufferer. This revelation has implications for the concept of Cognitive Dementias.



Principal Investigator:
Khanum Ridler

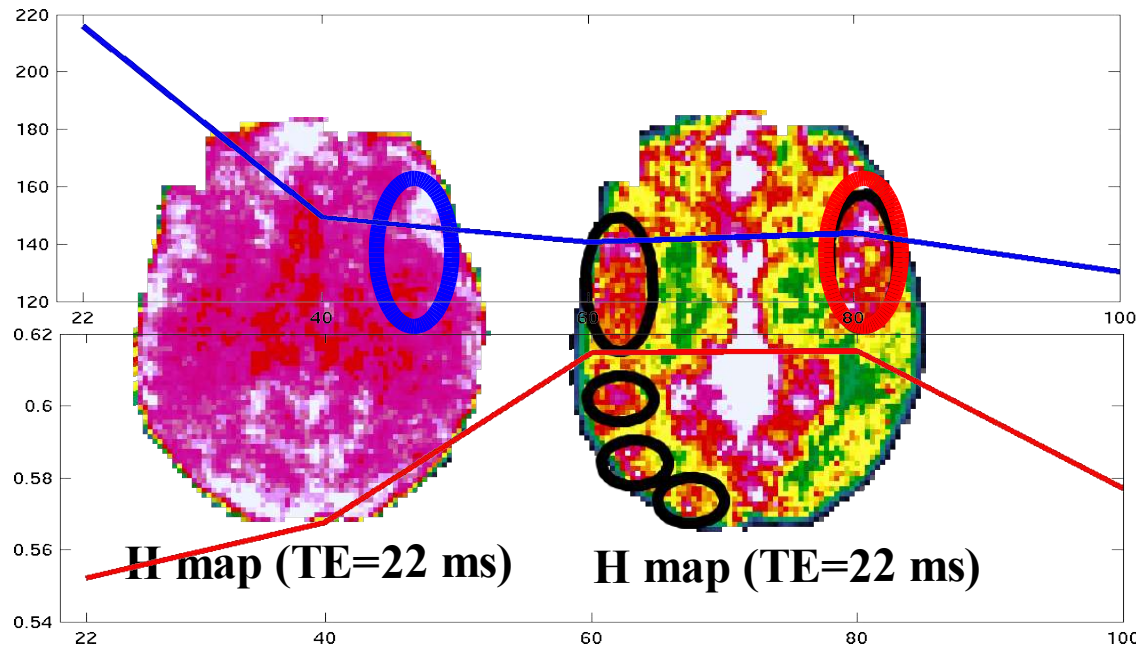
Collaborator:
Ed Bullmore
Peter Jones

Funding:
The Stanley
Foundation

Status:
On going

Effect of echo time (TE) on long term autocorrelations in BOLD fMRI noise

This study aims to characterise the change in autocorrelation with changing TE in terms of physics and physiology. Results shows that regions with high noise strength σ , σ decays exponentially with increasing TE.



Principal Investigator:
Alle Meije Wink

Collaborator:
John Suckling
Ed Bullmore

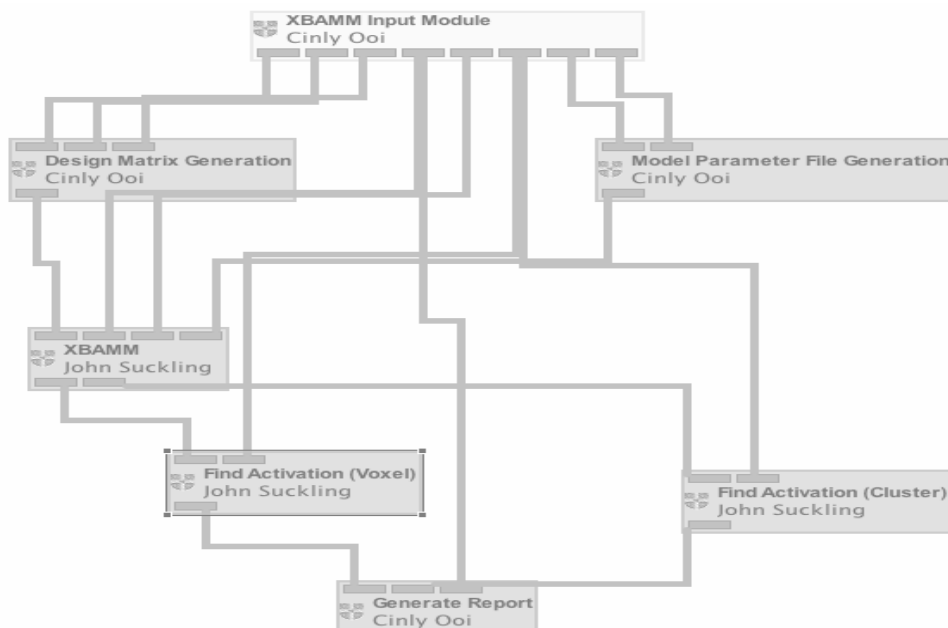
Funding:
NIH Human Brain
Project

Status:
On going



BrainFX : Visual pipeline processing framework

To develop a Visual Pipeline Processing Framework for the distribution of fMRI processing pipeline. On this platform, users and developers collaborate to help each other achieve their goals.



Principal Investigator:

Cinly Ooi

Collaborators:

John Suckling
Ed Bullmore

Funding:

NIH Human Brain
Project
Eclipse Innovation
Grant 2004

Status:

Basic software
completed.



A very big *Thank You* to:

- Mrs Cheryl Tetlow-Noell

for organizing and managing everything before, during and after the refurbishment on behalf of the BMU, including this opening ceremony.

- Prof Peter Jones



- Ms Karen Visser



For further information

<http://www-bmu.psychiatry.cam.ac.uk>

UNIVERSITY OF CAMBRIDGE
Department Of Psychiatry > Brain Mapping Unit

Projects

Title	Scanner
Exploring the Anatomy and Neurochemistry of Frontal Lobe Function in Health and Schizophrenia	WBIC, Cambridge
Exploration of Brain Systems Related to Associative Learning: Functional Neuroimaging, Psychopharmacological and Behavioural Studies In Humans	3 Tesla
Longitudinal fMRI Study of Memory Adaptivity	3D bruker head coil
Wavelets, fractals and fMRI brain adaptivity	Analyze images
Prefrontal Processes in Age related Memory Decline: Behavioural and Pharmacological Neuroimaging Investigations of the Role of Dopamine System	Interlaced (Oxford)

Research News

Latest News Page [Click here for more latest news]

- A functional MRI study of working memory task in euthymic bipolar disorder: evidence for task-specific dysfunction** Mar 29
Paul Monks, Jill Thompson, Edward Bullmore, John Suckling, Mick Brammer, Steve Williams, Andrew Simmons, Nicola Giles, Adrian Lloyd, C Harrison, Marco Seal, Robin Murray, I Ferrer, Allan Young and Vivienne Curtis
[application/pdf] [Abstract - Link to PubMed]
- The role of the lateral frontal cortex in causal associative learning: exploring preventative and super-learning** Mar 03
Danielle Turner, Michael Aitken, D Shanks, Barbara Sahakian, Trevor Robbins, Christian Schwarzbauer and Paul Fletcher
[application/pdf] [Abstract - Link to PubMed]
- Mapping the brain in autism. A voxel-based MRI study of volumetric differences and intercorrelations in autism** Jan 21
Grainne McAlonan, Vinci Cheung, Charlon Cheung, John Suckling, Grace Lam, K Tai, L Yip, Declan Murphy and Stew Chua
[application/pdf] [Abstract - Link to PubMed]

Contact Detail:

Mrs Cheryl Tetlow-Noell

Tel: +44(0)1223 336582

Fax: +44(0)1223 336581

email: cet31@cam.ac.uk

Department of Psychiatry, School of Clinical Medicine, University of Cambridge