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Radiology websites: Functional MRI websites

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Few useful Functional MRI Websites:

1. **Introduction to fMRI from Nuffield Department of Clinical Neurosciences. Oxford** is available from http://www.ndcn.ox.ac.uk/departments/FMRIB/research/introduction-to-fmri. Here 'Hannah Devlin describes how fMRI works and how it is used to discover how the brain works'.
2. **fMRI for Newbies** is an educative gateway authored by Jody Culham. The material is available at http://culhamlab.ssc.uwo.ca/fmri4newbies/. There are numerous sections like Tutorials, Brain Anatomy, Offline Resources and FAQs. The tutorials in the form Microsoft PowerPoint topics includes Introduction to fMRI and Philosophical Issues, From Neurons to BOLD: Origins of the fMRI Signal, fMRI Data Pre-processing, Experimental Design: Block Designs, Event Related Designs, Advance fMRI Analysis MVPA and MVPA Tutorial, Normalization, Brain Areas and Topography and Cortical Sulci. A useful set of links to Brain voyager is available at http://culhamlab.ssc.uwo.ca/fmri4newbies/BrainVoyager.html.
3. **fMRI Basics** is an online educative material from the Deutsches Krebsforschungszentrum Cancer Centre at Heidelberg. Authored by Heiko Meyer and available from http://www.dkfz-heidelberg.de/mrphys/fmri/hmeyer/fmri_basics/start.html, the material is divided into two sections: First is on fMRI covering Human brain, Methods for mapping neuronal activity, BOLD-effect, Physiological effect, Physical effect, Pulse sequences, Statistical methods and event related FMRI. The second section is on Talairach-System with Talairach-coordinates, AC-PC-basis, and Virtual Talairach-Daemon. More detailed material is available from http://www.dkfz.de/mrphys/fmri/fmriov.html.
4. **Duke University Brain Imaging and Analysis Centre** at http://www.biac.duke.edu/education/ offers formal undergraduate and graduate courses in functional neuroimaging complemented by many workshops."Created in 1998 as a component of the campus-wide neuroimaging initiative, the centre focusses on interdisciplinary solutions to fundamental research questions about the human brain". Few useful material is available in the education section at http://www.biac.duke.edu/education/courses/fall03/fmri/and https://www.biac.duke.edu/education/courses/fall05/fmri/.
5. **Centre for Functional MRI** from UC San Diego is available from http://fmri.ucsd.edu/index.php. Research and Education are two important section. A CTRI/CFMRI Joint Symposium on Functional Neuro Imaging at http://fmri.ucsd.edu/events/Symposium.html features topics on YouTube like New ways of doing fMRI, Can fMRI be used for Mind Reading?, Resting-state fMRI and the Human Connectome, Looking inside the sleeping brain with fMRI and Functional brain basis of elite performance.
6. **Oxford Centre for Functional Magnetic Resonance Imaging of the Brain (FMRIB)** is accessible at http://www.fmrib.ox.ac.uk/.There are various educative sections on fMRI featured in this portal. Indeed, a good starting point is the section on Physics Group at http://www.fmrib.ox.ac.uk/research/physics-groupthat briefly outlines current areas of research as in Acquisition and physics support, Diffusion Acquisition and Reconstruction, FMRI Acquisition and Reconstruction, FMRI Physiology, Microstructural Imaging, MR Spectroscopy, Neurovascular Imaging and Ultra high-field MRI Techniques and Hardware.
7. **Brain mapping** at http://www.brainmapping.org/is an educative portal on Functional MRI, created by Mark S Cohen from the UCLA Brain Mapping Division Los Angeles, CA. The website is largely "dedicated to the communication of news, science, and information of interest to the brain mapping community, and to sharing and promoting the science of brain mapping." Sections on Worldwide include Scientific Societies,

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Table 1: Few fMRI analysis software

Software	URL
3D Slicer	http://www.slicer.org/
AIR (Automated Image Registration)`	http://bishopw.loni.ucla.edu/AIR3/index.html
AFNI	http://afni.nimh.nih.gov/afni
Analyze	http://www.mayo.edu/research/labs/biomedical-imaging/software/analyze-software-system
Brain Imaging Software Toolbox	http://www.bic.mni.mcgill.ca/software/
Brain Voyager	http://www.brainvoyager.com/
Caret	http://brainvis.wustl.edu/wiki/index.php/Caret: About
Fiswidgets	http://sourceforge.net/projects/fiswidgets/
fMRI power	http://fmripower.org/
fMRI Toolbox	http://brainvisa.info/fmri_tbx.html
FMRISTAT	http://www.math.mcgill.ca/keith/fmristat/
FMRLAB	http://sccn.ucsd.edu/fmrlab/
FSL	http://fsl.fmrib.ox.ac.uk/fsl/fslwiki/
MRIcron	http://www.mccauslandcenter.sc.edu/mricro/mricron/
Princeton MVPA Toolbox	https://code.google.com/p/princeton-mvpa-toolbox/
PyMVPA Toolbox	http://www.pymvpa.org/
SPM	http://www.fil.ion.ucl.ac.uk/spm/
Statistical nonParametric Mapping	http://www.sph.umich.edu/ni-stat/SnPM/

Manufacturers, Journals, Specialty journals, Education, MRI Safety and Brain Mapping Links at http://www.brainmapping.org/Links.php. On the other hand sections within UCLA include Education, MRI Tools etc., Few journal citations for further reading is available at http://ccn.ucla.edu/wiki/index.php/Neuroimaging%2B_Journal_Club. Echo-planar imaging (EPI) and functional MRI is a primer at http://www.brainmapping.org/MarkCohen/Papers/EPI-fMRI.html.

8. **Chris Rorden's Neuropsychology Lab** at http://www.mccauslandcenter.sc.edu/CRNL/teaching is an online course that 'describes all stages of an fMRI study – from design of a behavioural task, to image processing, through to statistical analysis'. Lectures on MRI physics: Image Acquisition, Image Contrast, fMRI Paradigm Design, Statistics and Thresholding, Physiological Artifact Removal Tool, fMRI analysis and designs, Automated analysis with SPM, DTI tutorial and Arterial Spin Labeling are available to name a few. A neat list of useful tools are available at http://www.mccauslandcenter.sc.edu/CRNL/tools, 'used to tackle brain function, and offer solutions to help other cognitive neuroscience teams'
9. The **Talairach Daemon database** contains anatomical names for brain areas using x-y-z coordinates defined by the 1988 Talairach atlas. The software was based on the work by 'Lancaster JL, Woldorff MG, *et al*. Automated Talairach Atlas labels for functional brain mapping'. Human Brain Mapping (2000) 10:120-131'. **Talairach Software** was 'created and developed by Jack Lancaster and Peter Fox at the Research Imaging Institute of the University of Texas Health Science Centre San Antonio (UTHSCSA). The software available at http://www.talairach.org/has three parts, (a) Talairach Software called as Daemon and is a high-speed database server for querying and retrieving data about human brain structure over the internet, (b) Talairach Client: a Java application and(c) Talairach Applet: a web application for the daemon which includes graphical overlays and nearest gray matter searches.
10. **fMRI Analysis Software** are available as a built in clinical application of the vendors (Siemens Syngo Neuro fMRI with Inline BOLD Imaging, Philips Smart Line IView Bold real-time fMRI analysis, GE Brain Wave Fusion etc). However, there are fMRI centres and researchers all over the world who offer standalone mathematical and graphic software programmes. Expectedly, they are a varying combination of free, open source or payment programmes. Few standalone software for analysis of fMRI data from the MRI machines are given in the table at left.

Endpiece

The Multidisciplinary Research Platform (MRP) Neuroscience of Ghent University is a partnership involving researchers from the Faculties of Psychology, Medicine, Radiology, Engineering and Pharmaceutical Sciences at Ghent University, Belgium. The Radiology section is headed by Professor Rik Achten. An integrated fMRI Analysis of mind in humanities and brain in medicine and neuroscience, until now separately evaluated, is discussed in http://www.ugent.be/neuroscience/en/research.

A computational hardware support list for **Paradigm generation and details of fMRI hardware** is available from FM Kirby Research Centre, Kennedy Krieger Institute, Baltimore, Maryland at http://godzilla.kennedykrieger.org/fmri/index.html.

Elementary functional MRI Data Analysis: A User's Manual by Nick Szumski and Michael Rotte, MGH NMR Centre is available online athttp://neuro2.med.uni-magdeburg.de/~rotte/web_manual/. A **Primer on MRI and fMRI** authored by from Douglas C. Noll, Functional MRI Laboratory at University of Michigan is available at http://www.bme.umich.edu/labs/dnoll/files/MRI_fMRI_primer.pdf.

Few useful fMRI links are available as **Language Imaging Laboratory, Medical College of Wisconsin** at http://www.neuro.mcw.edu/links.html, f**MRI Neuroimaging centres** at http://www.meduniwien.ac.at/fmri/links/and **fMRI analysis programmes** at http://www.fmrimethods.org/index.php/Useful_links.