

Roundup of Useful AFNI Programs and Plugins

- Dataset Creation and Conversion
 - to3d** Read image files, write AFNI format datasets
 - 3dAFNIto3D** Convert AFNI format dataset to .3D format (ASCII lists)
 - 3dAFNItoANALYZE** Convert AFNI format dataset to ANALYZE format
 - 3dAFNItoMINC** Convert AFNI format dataset to MINC format
 - 3dANALYZEtoAFNI** Convert ANALYZE format dataset to AFNI format
 - 3dMINCtoAFNI** Convert MINC format dataset to AFNI format
 - 3dThreetoRGB** Convert 3 scalar datasets to 1 RGB AFNI format dataset
 - Auxiliary Programs for Dataset Creation from Images
 - Ifile** Read GE realtime EPI files and runs to3d
 - Imon** Read GE realtime EPI files as they are created
 - Dimon** Read DICOM files on disk or as they are created
 - rtfeedme** Dissect one dataset, sends images to AFNI realtime plugin
 - plugin: RT Options** Control options for AFNI realtime image input
 - from3d** Write dataset slices into image files
 - abut** Create zero-filled slices to put into dataset gaps
 - Quality Checks for 3D+time Datasets
 - 3dToutcount** Check voxel time series for quality (temporal outliers)
 - 3dTqual** Check dataset sub-bricks for quality (spatial outliers)
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- 3D+time Pre-Processing Programs
 - 3dTshift** Shift slices to a common time origin (temporal interpolation)
 - 3dDespike** Remove spikes from voxel time series
 - 3dDetrend** Remove trends from voxel time series
 - 3DFourier** FFT-based lowpass and highpass filtering
 - 3dTsmooth** Smooth time series in the time domain
 - 3D+time Analysis Programs
 - 3dDeconvolve** Multiple linear regression and deconvolution
 - 3dSynthesize** Compute 3d+time dataset from partial model
 - plugin: Deconvolution** Interactive deconvolution
 - 3ddelay** Single regressor linear analysis with time shifting
 - 3dNLfim** Nonlinear regression
 - plugin: Nlfit & Nlerr** Interactive nonlinear regression
 - 3dTcorrelate** Correlate two input datasets, voxel-by-voxel
 - 3dAutoTcorrelate** Correlate each voxel with every other voxel
 - 3dpc** Principal component analysis
 - Model 1D Time Series Generators
 - sqwave** Generate a square wave (a very old program)
 - waver** Generate hemodynamic responses to stimulus time series

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- Dataset Histogram and Segmentation Programs
 - 3dAnhist** Create and plot histogram of dataset, print peaks
 - 3dhistog** Create histogram of dataset to a file
 - plugin: **Histogram** Interactively graphs histogram of a dataset (or ROI)
 - plugin: **ScatterPlot** Interactively graphs 1 sub-brick vs. another (or ROI)
 - 3dClipLevel** Find value to threshold off outside-the-brain voxels
 - 3dUniformize** Correct T1-weighted dataset for non-uniform histogram
 - 3dIntracranial** Strip off outside-the-brain voxels
 - 3dSkullStrip** Enhanced skull stripping
 - plugin: **Gyrus Finder** Interactively segment gray and white matter
- Group Dataset Statistical Analysis Programs
 - 3dtttest** Paired and unpaired t-tests
 - 3dANOVA** 1-way ANOVA (fixed effects)
 - 3dANOVA2** 2-way ANOVA (fixed, random, mixed effects)
 - 3dANOVA3** 3-way ANOVA (fixed, random, mixed effects)
 - GroupAna** n-way (1-5) ANOVA (MatLab script)
 - 3dFriedman** Nonparametric Friedman test
 - 3dKruskalWallis** Nonparametric Kruskal-Wallis test
 - 3dWilcoxon** Nonparametric Wilcoxon test
 - 3dMannWhitney** Nonparametric 3dMannWhitney test
 - 3dRegAna** Voxel-wise linear regression analyses
 - 3dFDR** False Discovery Rate analysis
 - AlphaSim** Monte Carlo simulation for multiple comparison correction
 - 1dSEM** Structural Equation Modeling (path analysis)

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- Programs for Manipulating Information in the Dataset Header
 - 3dinfo** Print out information from the header
 - 3dAttribute** Print out a single header attribute
 - 3dnewid** Assign a new ID code to a dataset
 - 3drefit** Lets you change attributes in a dataset header
 - 3dNotes** Lets you put text notes into a dataset header
 - plugin: **Dataset NOTES** Interactive header notes editor
 - nifti_tool** Displays, modifies, copies nifti structures in datasets
- Programs for Changing Dataset Spatial Structure
 - 3daxialize** Rewrite dataset with slices in different direction
 - 3dresample** Rewrite dataset in new orientation, with new voxel size
 - 3dLRflip** Flip dataset Left ↔ Right
- Programs for Assembling Sub-bricks into 4D Datasets
 - 3dTcat** Assemble a 3D+time dataset from multiple input sub-bricks
 - 3dbucket** Assemble a bucket dataset from multiple input sub-bricks
- Programs for Changing Slice Structure
 - 3dZcat** Glue multiple sub-bricks together along the z-axis
 - 3dZcutup** Cut slices out of a dataset to make a ‘thinner’ dataset
 - 3dZeropad** Add zero slices around the edges of a dataset
 - 3dZregrid** Interpolate a dataset to a different slice thickness

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- Spatial Transformations of Dataset Geometry
 - 3drotate** Rigid body rotation of dataset in 3D
 - 3dWarp** Non-rigid transformation of 3D coordinates
 - 3dAnatNudge** Try to align EPI and structural volumes automatically
 - plugin: Nudge Dataset** Align EPI and structural volumes manually
 - 3dTagalign** Align datasets by matching manually placed 'tags'
 - plugin: Edit Tagset** Place 'tags' in a dataset interactively
 - adwarp** Transform dataset using warp from dataset header
 - Vecwarp** Transform 3-vectors using warp from dataset header
- Dataset File Manipulation
 - 3dcopy** Copy a dataset to make new files
 - 3drename** Rename dataset files
 - 3ddup** Make an 'empty' duplicate (warp-on-demand) of a dataset
 - 3dcopy** Copy a dataset to make new files
 - 3dTwotoComplex** Create complex dataset from two sub-bricks
 - 3dEmpty** Create header file only for specified dimensions

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- ROI Generation and Usage Programs
 - plugin: Draw Dataset** Manually draw ROI mask datasets
 - 3dAutomask** Generate a brain and skull-only mask
 - 3dAutobox** Automatically crop a dataset to remove empty space
 - 3dmaskave** Calculate dataset values averaged over a ROI
 - 3dmaskdump** Output all dataset values in a ROI
 - 3dROIstats** Calculate dataset values from multiple ROIs
 - 3dUndump** Create dataset from text (inverse of 3dmaskdump)
 - 3dOverlap** Create mask that is overlap of nonzero voxels from multiple datasets
 - 3dfractionize** Resample a mask dataset to a different resolution
 - whereami** Get atlas region name for coordinates

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- Simple Calculations on Datasets, Producing New Datasets
 - 3dcalc** Voxel-by-voxel general purpose calculator
 - 3dmerge** Various spatial filters, thresholds, and averaging
 - 3dTstat** Various statistics of multi-brick datasets, voxel-by-voxel
 - 3dMean** Average datasets together, voxel-by-voxel, for each timept
 - 3dWinsor** Nonlinear order statistics filter for spatial smoothing
 - 3danisosmooth** Edge preserving filter for spatial smoothing
 - 3dLocalstat** Find simple statistical values for neighborhoods around each voxel
 - 3dLocalBistat** Compute various bivariate statistics for neighborhoods around each voxel
 - 3dmatcalc** Applies matrix to datasets
- Computation of Various Numbers from Datasets
 - 3ddot** Dot product (correlation coefficient) of 2 sub-bricks
 - 3dclust** Find spatially connected clusters of nonzero voxels
 - 3dStatClust** Find statistically connected clusters
 - 3dExtrema** Find local maxima (or minima) of datasets
 - 3dFWHM** Estimate Full Width Half Max of dataset spatial correlation
 - 3dFWHMx** Estimate FWHM for all sub-bricks of dataset
 - 3dBlurToFWHM** Spatially variable blurring for uniform FWHM
 - 3dBrickStat** Simple statistics (max, min, mean) for scripts
 - 3dGetrow** Output voxel values for a row/column in x,y,z space
 - 3dDWItoDT** Compute diffusion tensor, eigenvalues from DWI data
 - 3dTEig** Compute eigenvalues from diffusion tensor data

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- Simulated Dataset Generators
 - 3dTSgen** Generate 3D+time dataset from 1D model and noise
 - AlphaSim** Simulate datasets and estimate statistical power
 - 3dConvolve** Simulate datasets via convolution
 - 3dInvfMRI** Compute stimulus time series given activation map and 3D+time dataset
- Programs for Dealing with 1D Time Series
 - 1dcat** Catenate them horizontally
 - 1deval** 1D calculator (like 3dcalc for 1D files)
 - 1dplot** Graph values from columns in a file
 - 1dgrayplot** Show values from columns in a file as bands of gray levels
 - 1dtranspose** Transpose 1D files (interchange rows and columns)
 - 1dmatcalc** Matrix calculator for 1D files
 - 1dMarry** Combine ragged 1D files for use with 3dDeconvolve's -stim_times_AM2 option
- Image Registration Programs
 - 3dvolreg** Volumetric registration (rigid body in 3D)
 - 3dWarpDrive** Enhanced volumetric registration, includes warping
 - 3dAllineate** Cross-modality affine volume registration
 - 2dImReg** Slice-by-slice registration (rigid body in 2D)

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- Miscellaneous File Manipulations
 - 2swap** Byte pair swap: ab ba
 - 4swap** Byte quad swap: abc dcba
 - 24swap** Mixed 2 and 4 byte swaps in same file
 - strblast** Find a string in a file and replace it with junk
- Miscellaneous Utilities
 - byteorder** Report the byteorder of the current CPU
 - ccalc** A command line calculator (like `3dcalc`)
 - cdf** Compute probabilities, thresholds for standard distributions
 - count** Generate numbered strings for command line scripts
- Image File Header Printouts
 - dicom_hdr** Print information from a DICOM file
 - ge_header** Print information from a GE I. file
 - mayo_analyze** Print information from an ANALYZE .hdr file
 - siemens_vision** Print information from a Siemens Vision .ima file
- Miscellaneous Visualization Tools
 - aiv** AFNI Image Viewer program
 - plugin: **Render[new]** Interactive volume rendering
 - plugin: **Dataset#N** Graph extra dataset time series in AFNI graph viewer

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- Surface mapping tools
 - SUMA** Surface Mapping display
 - DriveSuma** Send commands to SUMA program from script
 - @SUMA_Make_Spec_FS** Convert Freesurfer surfaces to SUMA spec files
 - @SUMA_Make_Spec_SF** Convert SureFit surfaces to SUMA spec files
 - 3dSurf2Vol** Compute volume equivalent from surface or pair of surfaces
 - 3dVol2Surf** Assign values to surface nodes from volumetric data
 - 3dSurfMask** Generate volumetric mask for inside of surface
 - CompareSurfaces** Compute distances between two surfaces at each node
 - ConvertSurface** Convert surface files among various formats
 - IsoSurface** Extract isosurface from a volume
 - SurfClust** Find clusters on surfaces
 - SurfDsetInfo** Display information about surface dataset
 - SurfInfo** Show information on surface
 - SurfMeasures** Compute various measurements for surface or pair of surfaces
 - SurfMesh** Reduce number of points in surface mesh
 - SurfPatch** Extract patch of surface or compute volume from specified nodes
 - SurfQual** Quality check for surfaces
 - SurfSmooth** Smooth surfaces
 - SurfToSurf** Interpolate data from one surface onto mesh of another surface
 - SurfaceMetrics** Provides information on surface mesh
 - MapIcosahedron** Create new version of surface mesh using mesh of icosahedron

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- Miscellaneous Scripts and Script Tools

afni_proc.py	Python program to generate tcsh script for processing single subject FMRI data
@auto_tlrc	Automatic transformation of dataset to match Talairach template
@CommandGlobb	Execute AFNI commands for multiple datasets
@make_stim_file	Make stim file for 3dDeconvolve from user input or file
@UpdateAfni	Sample script for updates (also AFNI_UPDATER)