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)

- 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

- 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

3dttest	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
3dClustSim	Monte Carlo simulation for multiple comparison correction
1dSEM	Structural Equation Modeling (path analysis)

- 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

- 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

- 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

- 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 aroundeach 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
3dDTeig	Compute eigenvalues from diffusion tensor data

- Simulated Dataset Generators

3dTSgen	Generate 3D+time dataset from 1D model and noise
3dClustSim	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)

- 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 froman 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

- 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

- 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)