

# SpectralBrain — library architecture

Neuroimaging inputs · FreeSurfer · GIFTI · NIFTI/MGZ · HippUnfold v1/v2 · TractSeg · meshes · point clouds



spectralbrain.io — loaders · BIDS / SUBJECTS\_DIR discovery · load\_group · resample\_to\_template



**spectralbrain (core)** — **BrainMesh · BrainPointCloud · GroupData · LBO decompose()**



spectral

ShapeDNA · HKS · SI-HKS  
WKS · GPS · BKS / iBKS  
wavelets · functional maps  
distances

statistics

vertex-wise FWE / FDR / TFCE  
DeLong · BCa bootstrap  
ComBat / ComBat-GAM  
6 PyMC Bayesian models

viz

template-free 6-view 3D  
unfolded flat-maps  
cluster overlays  
posterior plots



spectralbrain.backends (pluggable, cross-cutting)  
eigensolvers: NumPy · PyTorch · CuPy · JAX      samplers: PyMC · nutpie · NumPyro · BlackJAX



input / I/O



core data model



spectral descriptors



statistics