

## Index

- ABIDE 139  
 access hypothesis 287  
 action potential 9  
 AD 65  
 adaptation 188  
 additivity 84–85, 106, 111  
 ADHD 139, 187, 293  
 adjacency matrix 262  
 ADNI 140  
 AFNI 130  
 aliasing 221  
 alpha band 242  
 alternating current (AC) amplifier 218  
 alternating current (AC) noise 235  
 Alzheimer's 3, 96, 140, 290  
 amplitude 10, 203  
 amplitude spectrum 242  
 amplitude spectral density (ASD) 242  
 analog-to-digital (AD) converter 218  
 analog-to-digital (AD) level 219  
 analysis of variance 150  
 analytic signal 260  
 anatomical imaging 49  
 anisotropy 62  
 annihilation 94  
 anode 303  
 ANOVA 150, 155  
 anticorrelations 175  
 Arterial spin labeling 91  
 artifacts 50, 129  
 ASL 91  
 auditory 124  
 auditory brainstem response 248  
 autism 3, 68, 139, 187  
 autocorrelation function (ACF) 269  
 autoregression 269  
 autocorrelation 146  
 autoregressive (AR) model 271  
 autoregressive integrated moving average (ARIMA) model 271  
 autoregressive moving average (ARMA) model 271  
 average reference 236  
 axial diffusivity 65  
 axial gradiometer 225  
 axon 7  
 band-cut filter 239  
 band-pass filtering 11  
 baseline 118  
 Bayesian 150  
 beamformer 286  
 beta band 244  
 beta parameters 143  
 beta-series correlations 171  
 bipolar derivation 236  
 block design 109  
 block length 111  
 blood oxygenation 81  
 blood-oxygenation-level dependent 89  
 BOLD 88  
 Bonferroni correction 152–153  
 brain extraction 51  
 brain volume 57  
 brain-machine interface 208  
 BrainVoyager 130  
 calcarine sulcus 54–55, 74, 98–99  
 cathode 303  
 causal methods 292  
 causality 293  
 CE CT 48  
 cerebellum 161  
 cerebrospinal fluid (CSF) 41, 48, 51, 210, 221  
 chemical environment 69  
 chronometry 105  
 cingulate 161, 297  
 circular 139, 157–158, 162  
 circular statistics 265  
 circularity 158  
 clustering 15  
 cluster-wise 154  
 cognitive process 118, 160–161  
 Cohen's *d* 60  
 coil 43, 222  
 coincidence detection 94

- complex Morlet wavelet 260
- computerized tomography 48
- condition-rich 118
- condition-rich design 183
- consciousness 207
- continuous wavelet transform (CWT) 259
- contrast 41
- convolution 145, 147, 257
- coregistration 135, 228
- correction for multiple comparisons 151
- correlational MVPA 177
- cortical thickness 16, 53
- counterbalancing 112
- covariates 144
- creatine 73
- cross-slice excitation 46
- cross-validation 178
- CT 48
- cyclotron 94
  
- databases 139
- DBS 293
- Decade of the Brain 1, 92
- decision boundary 177
- decoding MVPA 177, 287
- deep brain stimulation 293
- deep neural network 182
- default mode network 122, 174
- delta band 244
- demagnetization 228
- dendritic tree 7
- deoxyhemoglobin 81
- dephasing 33
- depression 3, 57, 68, 187, 293, 296, 301
- dewar 222
- diagnosis 3
- diagnostic 187
- diagnostics 289
- diagonalization 63
- DICOM 130
- difference wave 247
- diffusion 62
- diffusion tensor imaging 61
- diffusion-weighted imaging 62
- dipole 285
- direct current (DC) amplifier 218
- direct influence 166
- directional statistics 265
  
- discrete Fourier transform (DFT) 238
- discrete wavelet transform (DWT) 259
- DMN 174
- Donders 105
- dopamine 96
- double dipping 157
- down-sampling 240
- DTI 61
- dummy scanner 123
- DWI 62
- dynamic causal modeling 169
- dyscalculia 289
- dyslexia 287
  
- earlobe 216
- ECD 285
- echo time 42
- echo-planar imaging 37
- ECoG 296
- eddy currents 64
- edited spectrum 72
- effective connectivity 169
- efficiency 111, 118, 125, 146–148
- efficient 109
- electric field 194
- electrically shielded room 219
- electrocardiogram 233
- electrocorticography (ECoG) 205, 296
- electrode 211
- electroencephalography (EEG) 22, 194, 210
- electromagnetic field 198
- electromyogram (EMG) 232
- electrooculography (EOG) 217
- ellipsoid 63
- emotion recognition 300
- EPI 36, 62, 64, 89–90
- epileptic 295
- equivalent current dipole 285
- ethical 294
- event-related design 102, 110, 115–118, 125, 147
- event-related paradigm 246
- event-related potential (ERP) 246
- event-related response 116
- event-related synchrony (ERS) 269
- evoked potential (EP) 246
- excitability 303
- excitation 35, 41–43, 46, 134–135

- excitatory neuron 9  
 excited nuclei 35  
 exploratory analysis 107  
 extracellular single-unit recordings 22  
 extrastriate body area 300  
  
 FA 65  
 faces 23, 25, 113–114, 124, 156  
 factor analysis 152  
 false discovery rate 153  
 family-wise error 153  
 Faraday cage 219  
 Faraday's law of induction 222  
 fast Fourier transform (FFT) 239, 241  
 FDG 96  
 FDR 153–154  
 FFA 114, 156, 279  
 field inhomogeneity 89  
 field of view 46  
 field strength 35, 43, 69, 71, 88–90  
 filtering 11  
 fixation condition 120  
 flatmaps 54  
 flattening 54  
 Fleming's right-hand rule 222  
 flex fixing loop (FFL) 222  
 flexibility 139  
 flip angle 46  
 fluorodeoxyglucose 96  
 fMRI 88  
 FMRI Software Library 130  
 fNIRS 96  
 focused ultrasound stimulation 297  
 forward inference 160–162  
 Fourier analysis 38  
 Fourier coefficient 242  
 fractional anisotropy 65  
*F*-ratio 150  
 FreeSurfer 53, 130  
 frequency 10, 200  
 frequency components 10–12, 38  
 frequency-encoding 36  
 frequency spectrum 11  
 frequency-domain representation 238  
 frontal 17, 59, 68, 91, 129, 160  
 frontal eye fields 295  
 frontal midline theta (Fm $\theta$ ) activity 244  
 frontoparietal 160  
  
 FSL 130  
 full width at half maximum 138  
 functional connectivity 163  
 functional localizer 108, 156  
 functional magnetic resonance imaging 88  
 functional near-infrared spectroscopy 96  
 FUS 297  
 fusiform 295  
 fusiform face area 114, 156, 280, 283  
 FWE 153–154, 162  
 FWHM 138, 154  
  
 GABA 9, 15, 70–71, 73–74  
 gamma band 244  
 Gaussian filter 138  
 general linear model 142, 144, 162  
 geometric distortions 40, 135  
 glass brains 150  
 GLM 144–146, 148, 151  
 glutamate 9, 70–71  
 gradient reversal 37  
 gradient-echo 37  
 gradients 35  
 gradiometer 224  
 Granger (G) causality 271  
 Granger–Geweke (GG) causality 272  
 graph theory 174  
 gray matter 7  
 ground electrode 217  
  
 half-life 94  
 head model 285  
 head position indicator 228, 234  
 helium 43  
 hemodynamic neuroimaging 77  
 hemodynamic response function 81  
 hemodynamics 14  
 hemoglobin 81  
 hertz 10  
 high gamma band 244  
 high-cut filter 239  
 high-pass filter 239  
 high-pass filtering 11, 22–23, 85, 145  
 Hilbert transform 259  
 histology 19  
 HRF 81, 83–85, 88, 90, 97, 108–109, 111,  
 116–117, 145, 147  
 Human Connectome Project 140

- hyperacuity 183
- hypometabolism 96
- ICA 174
- ICBM152 52
- IgNobel 152
- image processing 127
- imaginary axis 202
- impulse response function 81
- incidental findings* 50
- independent component analysis 174
- independent component analysis (ICA) 236
- inference 128, 159
- inferior frontal gyrus 288
- inferotemporal cortex 279
- inflammation 48, 73
- inflate 54
- inhibitory neuron 9
- inion 213, 215
- in-plane voxel size 46
- input coil 222
- instantaneous phase 245, 259
- intelligence 59, 75
- inter-trial phase coherence (ITPC) 265
- interleaved slice acquisition 35
- international 10–10 system 215
- international 10–20 system 212
- inter-slice gap 45
- interstimulus interval 109
- Intracranial recordings 22
- intraparietal 120, 162
- invasiveness 18
- ISI 109
- isotropic 45
- jacobian 56
- Jennifer Aniston neuron 23
- jitter 115
- Josephson effect 222
- k*-space 39
- lagged synchrony 262
- Larmor frequency 33, 35, 40, 89
- latency 246
- lateral occipital complex 114
- lateral parietal 122
- LFPs 22, 85, 88
- lie detection 3
- linear discriminants 178
- linear regression 142–143, 146
- liquid helium 222
- LOC 114
- local field potentials 22, 85–86
- locked-in syndrome 3
- longitudinal magnetization 41
- LORETA 285
- low gamma band 244
- low-cut filter 239
- low-pass filter 239
- low-pass filtering 11
- magnetic field 34, 197
- magnetic gradients 36
- magnetic resonance imaging 31
- magnetic resonance spectroscopy 68
- magnetic resonance spectroscopy imaging 71
- magnetically shielded room 226
- magnetocardiogram 226
- magnetoencephalography (MEG) 22, 198, 221
- magnetometer 224
- mastoid 216
- Matched Filter Theorem 138
- Matlab 123, 128
- matrix size 46
- MCE 285
- MD 65
- mean diffusion 65
- media 2–4, 26–27
- medial prefrontal 122, 162
- medial prefrontal cortex 162
- mediated influence 166
- microstimulation 293
- migraine 302
- mild cognitive impairment 3, 73, 96
- Mild Cognitive Impairment 290
- mind-body problem 207
- mismatch negativity (MNN) 247
- MNE 285
- MNI 52
- mock scanner 123
- monopolar derivation 235
- montage 235
- Morlet wavelet 255
- morphometry 56, 58, 75
- motion 167

- motion correction 132–133
- motion-correction parameters 134–135, 144, 148
- moving average (MA) model 271
- MRI *See* magnetic resonance imaging
- MRI safety 32
- MRIcron 131
- MRS 68
- MRSI 71
- MUA 85
- multifactorial designs 150
- multi-modal imaging 277
- multiple comparisons 57, 66, 142, 151–153, 155, 157, 162
- multiple regression 143
- multi-unit recording 22
- multivariate pattern analyses 176
- multi-voxel pattern analyses 176
- Mumetal 226
- MVPA 176
  
- N170 25, 282
- nasion 213, 215
- nasopharyngeal reference 216
- NE CT 48
- near-infrared 96
- negative overshoot 82–83, 97
- network analysis 262
- neurofeedback 292
- neurological convention 131
- neuromodulation 292
- neurotransmitter 9, 13–14
- neurovascular coupling 81
- NHST 150
- Ni-alloy 226
- NifTI 131
- NiPy 130
- node degree 174
- nonparametric 150
- normalization 50, 137
- notch filter 239
- nuclear magnetic resonance 33
- nuclei 7
- nuisance regressors 145, 148
- null hypothesis significance testing 150
- numerosity 170
- Nyquist 11
- Nyquist theorem 219, 240
  
- object-selective 114, 121
- obsessive-compulsive disorder 296
- occipital 16, 29, 58, 98, 113, 120
- occipital face area 283, 300
- occipitotemporal 114
- one-back 112, 121
- onset asynchrony 112
- optical imaging 18
- optogenetics 88
- orientation columns 18
- orthogonal task 124
- oxygen-15 94
  
- P3 246
- P300 246
- pacemaker 297
- parahippocampal 278
- parametric design 108
- parametric statistics 140, 148, 150
- parietal 16, 59, 101, 160–161, 289
- Parkinson 296
- partial autocorrelation function (PACF) 271
- partial correlation 146
- partial phase locking (PPL) 269
- patch-clamp recordings 22
- path length 174
- PCA 153, 173
- percent signal change 119
- perfusion 91
- Permalloy 226
- permutation 150
- personality 3, 59, 75
- PET 92
- PGSE 63
- phase 10, 201, 259
- phase coherence 261
- phase encoding 35
- phase-locking factor (PLF) 265
- phase shift 245
- phase synchrony 260
- phased-array coils 44
- phase-locking index (PLI) 261
- phosphene 298, 300
- photo receivers 96
- photo transmitters 96
- pick-up coil 222
- placebo 301
- planar gradiometer 224

- point-spread function 90
- polar plot 201
- positron emission tomography 92
- posterior cingulate 122, 161
- postsynaptic potential 195, 210
- power 109
- power spectral density (PSD) 242
- power spectrum 242
- PPI 171
- preamplifier 218
- preauricular point 213, 228
- precuneus 122
- prefrontal 120, 161, 289
- prefrontal cortex 302
- preprocessing 64, 127, 129–132, 142, 145, 148, 152, 155, 232
- primary auditory cortex 288
- primary current 210
- primary motor cortex 300
- primary visual cortex 16, 18, 74, 86, 98, 113, 155, 157, 278, 288, 298
- principal component analysis 153, 173
- prosopagnosia 114
- proton density 42
- PSF 90
- psychophysiological interaction 171
- Psychtoolbox 123
- pulse sequence 36
- pulsed gradient 63
- Python 123
  
- quality control 127, 129, 137, 139–140
  
- radial dipole 229
- radioactive 93
- radiological convention 131
- radionuclides 94
- random-effects analysis 57, 66, 121
- rapid counterbalanced event-related 116
- rapid eye movement (REM) sleep 245
- RD 65
- reaction time 105–106, 142–143, 145
- real axis 202
- redundancy 153
- reference electrode 216
- region-of-interest analyses 155
- regressors of interest 144, 148
- relative phase 261
- repetition time 31, 41–42, 46
- repetitive TMS 300
- repositories 139
- representational hypothesis 287
- representational similarity analysis 182, 278–279
- reproducibility 139
- rereference 235
- resampling 240
- reslicing 133
- respiration 233
- response registration 124
- rest condition 118
- resting potential 9
- resting-state 122
- resting-state fMRI 173
- retinotopy 98
- return current 210
- reverse inference xvii, 160–162
- RF pulse 33
- rigid transformation 51, 133
- ROI 155
- root-mean-square 86
- RS fMRI 173
- RSA 182
- run 112
  
- 7T 43
- safety 34, 61, 123
- salmon 151
- sample size 67, 139
- sample sizes 123
- sampling frequency 11, 219
- sampling rate 219
- sampling theorem 219
- scalogram 257
- scalp distribution 246
- schizophrenia 3, 67, 74, 187
- scrubbing 168
- searchlight analysis 178
- second-level 154
- seed region 164
- segmentation 51, 236
- segmentation-based normalization 51
- selective attention 107–108
- SEM 169
- sensor-level signal 204
- sex 58–60

- sham condition 301, 304  
 shared influence 167  
 shimming 70  
 short time Fourier transform (STFT) 252  
 signal-to-noise ratio 71, 112, 123, 138, 212  
 simultaneous fMRI-EEG 283  
 simultaneous multi-modal imaging 281  
 single-trial phase-locking value (S-PLV) 261  
 single-voxel MRS 70  
 skepticism 5  
 sleep spindle 204  
 slice thickness 45  
 slice timing 131  
 slice-selection gradient 35  
 slow event-related 115  
 slow-wave sleep (SWS) 245  
 software 127, 131, 133  
 soma 7  
 somatosensation 124  
 somatosensory cortex 298  
 SOP 158  
 source estimation 285  
 source localization 284  
 spatial resolution 18  
 spatial smoothing 137  
 specific absorption rate 35  
 spectral analysis 241  
 spectrogram 13, 253  
 spectroscopy 69  
 spin 33  
 spin-echo 38  
 spin-lattice relaxation 41  
 spin-spin interactions 42  
 spline fitting 51  
 SPM 72, 128, 130, 133, 136, 138, 150, 153  
 standard operating procedure 158  
 Statistical Parametric Mapping 128  
 steady-state evoked potential (ssEP) 248  
 stereo EEG (sEEG) 205  
 stimulation 293  
 stimulus presentation 124  
 stroke 58, 73, 122  
 structural equation modeling 169  
 structural imaging 48  
 SUA 85  
 subsampling 240  
 subtraction method 104–106, 108, 118, 122, 125, 159  
 Superconducting QUantum Interference Device (SQUID) 222  
 superconductivity 222  
 superior temporal gyrus 288  
 superior temporal sulcus 283  
 support vector machines 178  
 surface coil 44  
 surface-based normalization 53  
 surround suppression 73  
 SVM 178  
 synchrony index (SI) 261  
 T1 recovery 40–42  
 T1-weighted 42  
 T1-weighted MRI 49  
 T2 decay 41–42, 89  
 T2\* 89  
 T2-weighted 42  
 TACS 305  
 Talairach 52  
 tangential dipole 229  
*t*-contrast 120, 148, 150–151, 154  
 TCS 303  
 TDCS 304  
 template 52  
 temporal resolution 18  
 tensor 63  
 tesla 32  
 theta band 244  
 threshold-free cluster analysis 154  
 time plot 201  
 time series 112  
 time-domain representation 238  
 tissue susceptibility 89  
 TMS 298  
 topographic maps 16  
 tracer 93  
 tractography 64  
 transcranial alternating current stimulation (tACS) 199, 211, 305  
 transcranial current stimulation 303  
 transcranial direct current stimulation 304  
 transcranial direct current stimulation (tDCS) 199, 211  
 transcranial magnetic stimulation (TMS) 199, 298  
 transcranial random noise stimulation 305  
 transparency 139  
 transverse magnetization 41

- trial averaging 246, 267
- TRNS 305
- tumors 3, 20, 48, 50, 73
- t*-value 149–151, 154
- type-I error 150–153, 250
  
- ultrasound 297
- uncertainty principle of Fourier transform 254
- univariate analyses 176
- up-sampling 240
  
- VBM 57
- vertex 54, 301
- visuomotor 124
- VLSM 58
  
- volume coil 44
- volume-based normalization 50
- voxel 40
- voxel-based lesion-symptom mapping 58
- voxel-wise correction 153
  
- water suppression 71
- wavelength 200
- wavelet transform 255
- white matter 7
- whiten 146
- whole-brain analyses 154
- window function 241, 254
  
- X-ray 48