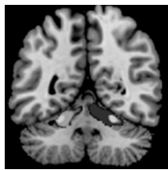
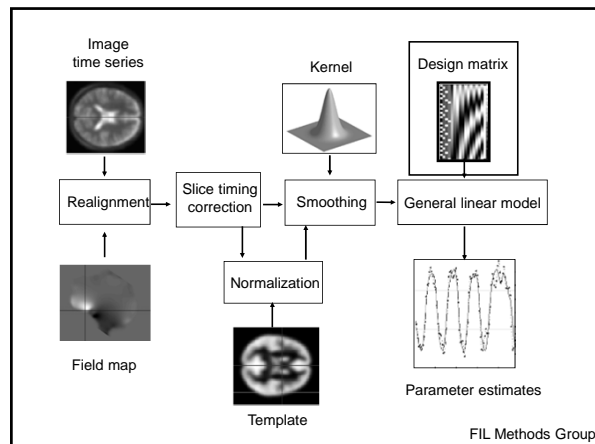


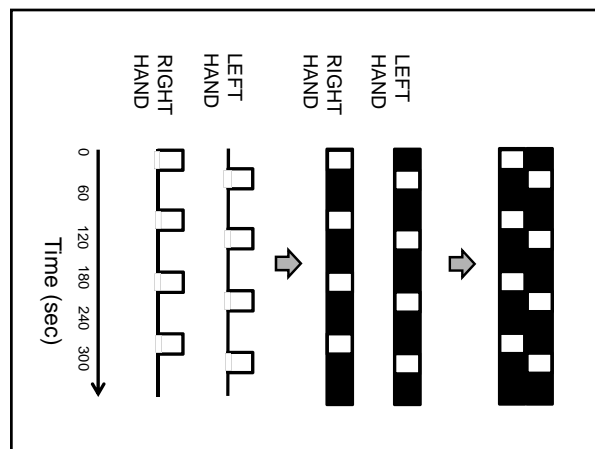
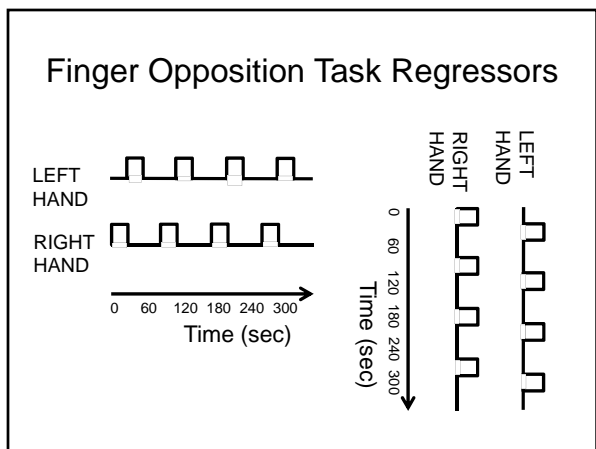
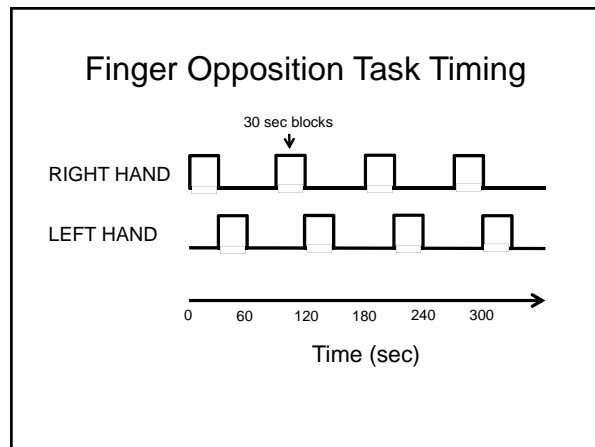
Functional Connectivity

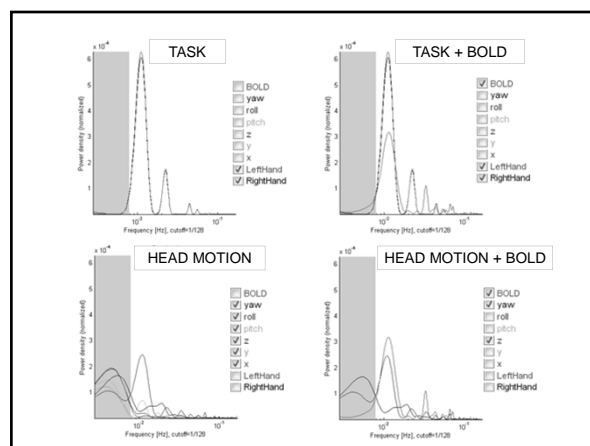
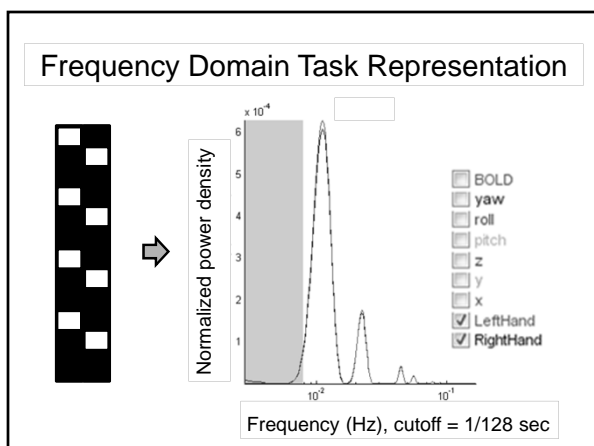
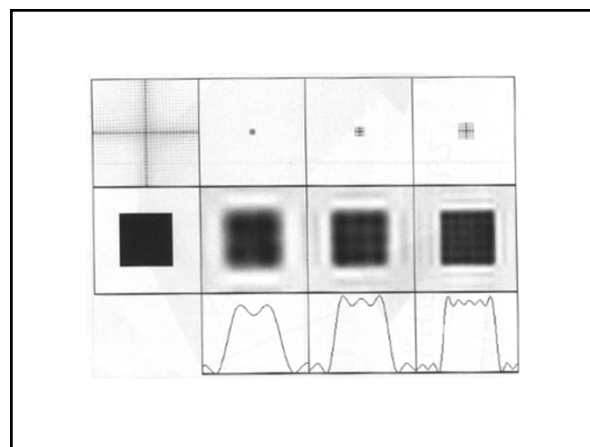
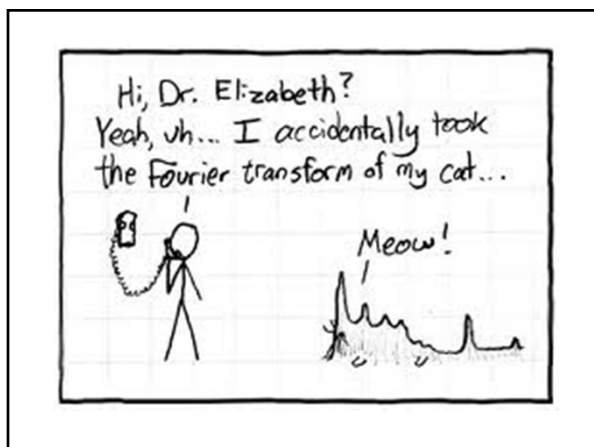
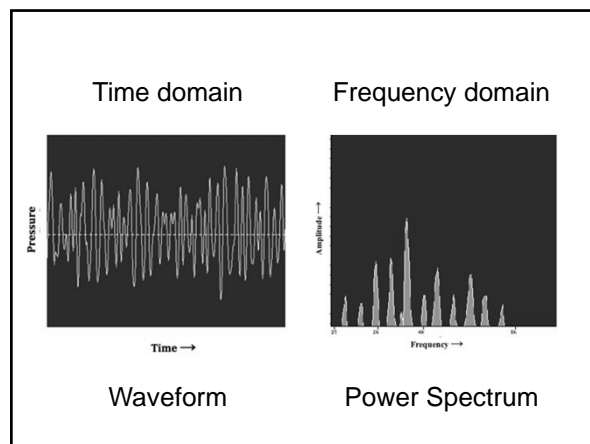
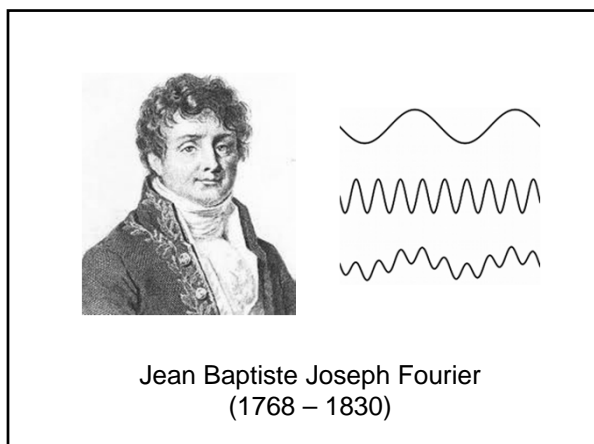
Modeling, Estimation and Inference

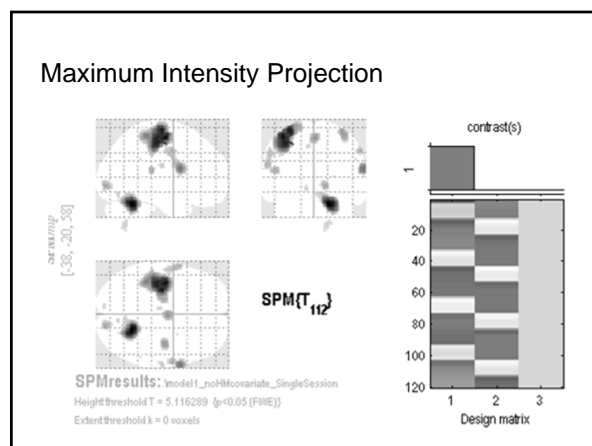
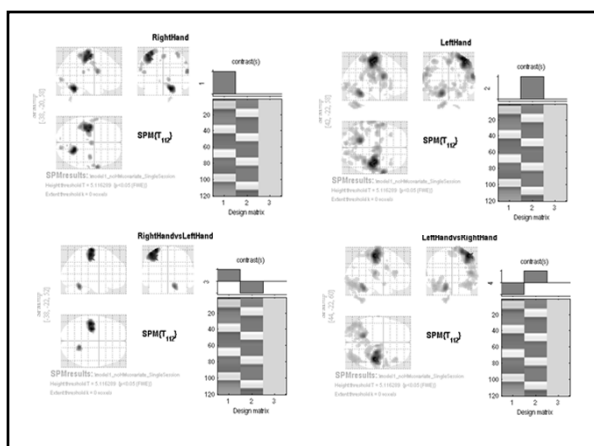
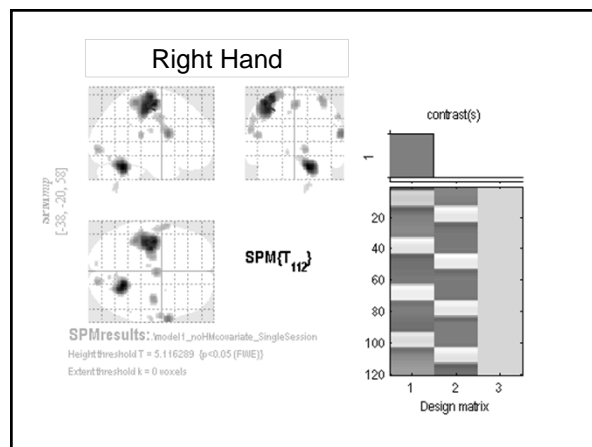
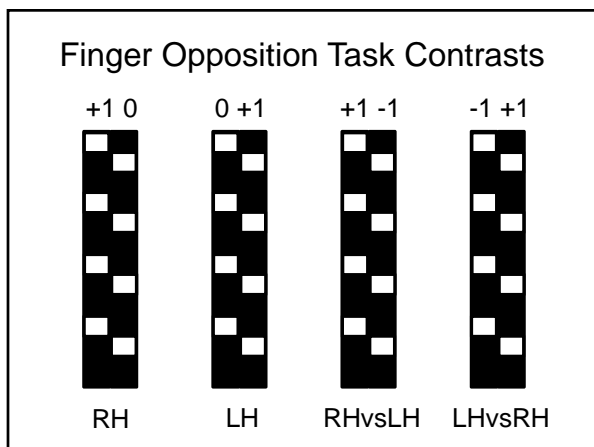
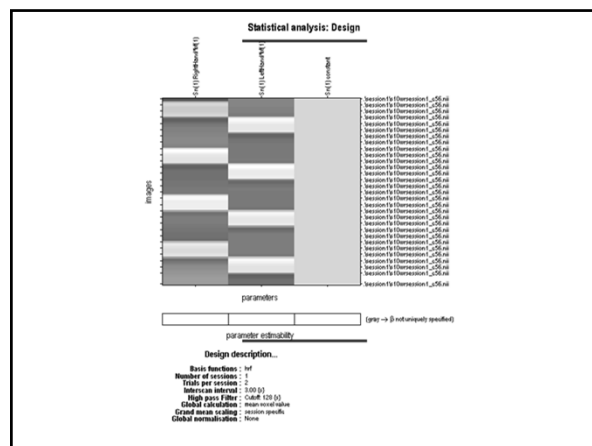
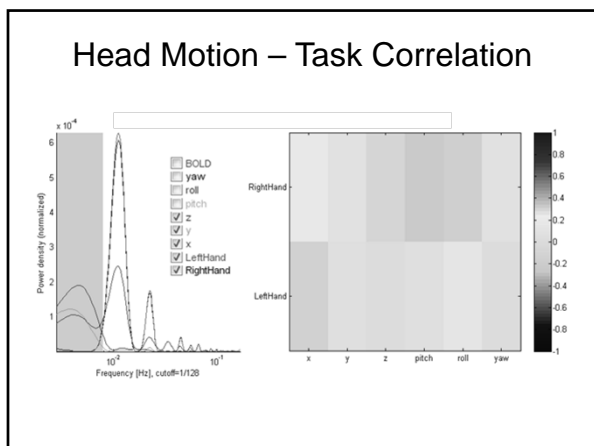



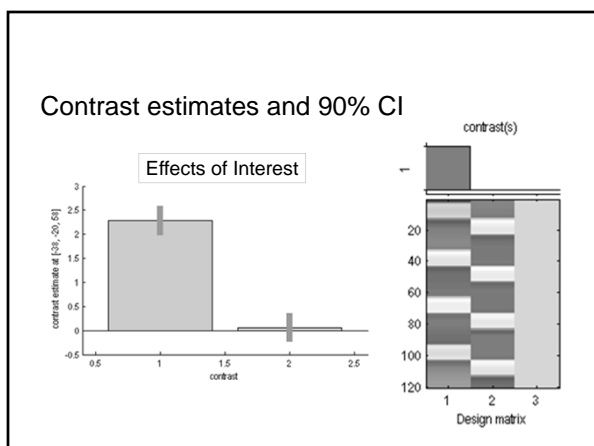
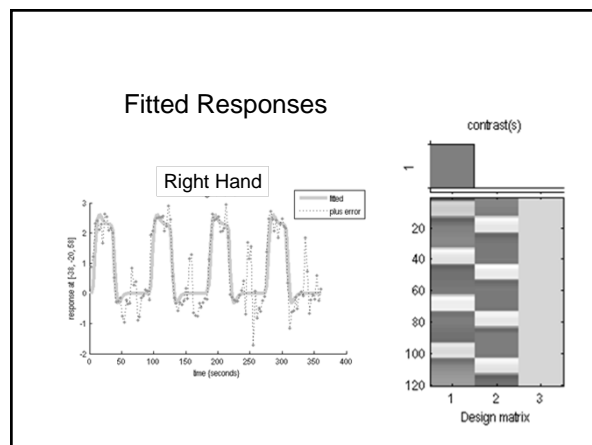
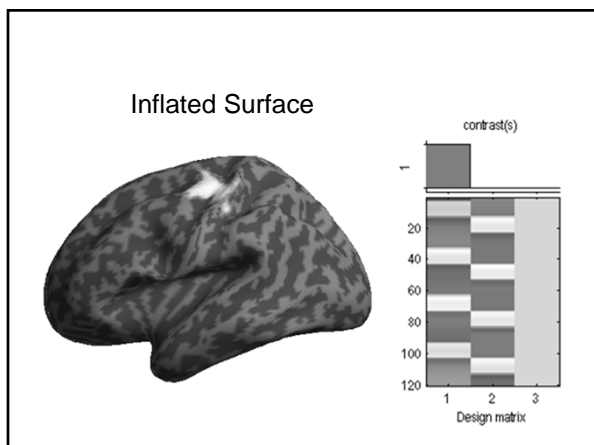
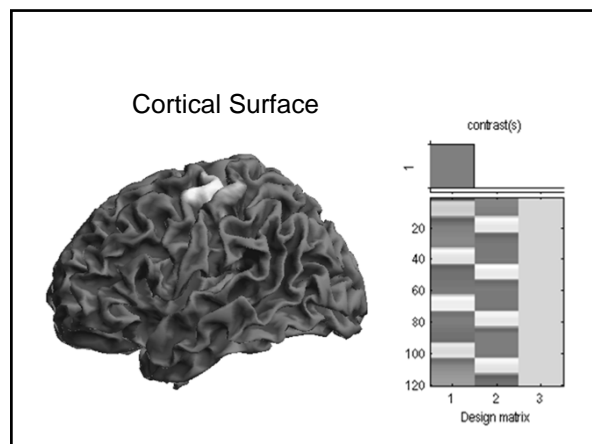
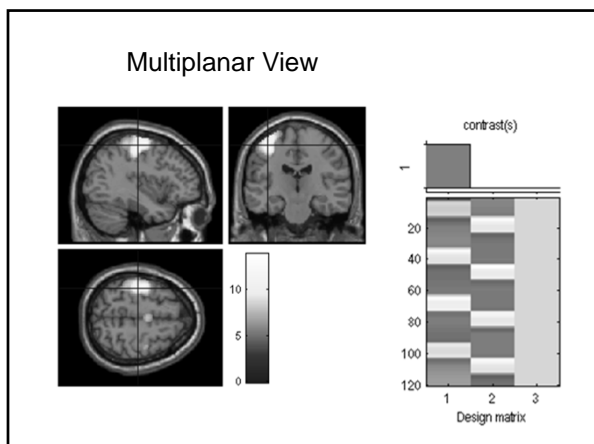
Finger Opposition Task

Instructions to the subject:
Please perform sequential finger oppositions at a rate of 80 oppositions per minute, alternating hands.









Statistics: p-values adjusted for search volume

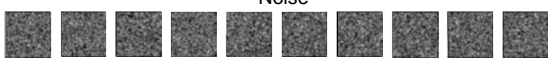
set-level		cluster-level				peak-level				mm mm mm	
P	C	P _{FDR} Bonf	q _{FDR} Bonf	k _E	p _{uncorr}	P _{FDR} Bonf	q _{FDR} Bonf	Z _(p)	p _{uncorr}		
0.00017	0.000	0.000	0.000	751	0.000	0.000	0.000	13.90	Inf	0.000	18 -52 -24
						0.007	0.173	5.62	5.28	0.000	6 -62 -12
						0.000	0.000	13.02	Inf	0.000	-40 -30 60
						0.000	0.000	12.62	Inf	0.000	-32 -14 70
						0.000	0.000	12.56	Inf	0.000	-26 -20 54
						0.000	0.000	9.09	7.54	0.000	64 8 16
						0.000	0.000	7.88	7.01	0.000	2 -6 60
						0.000	0.000	7.62	6.82	0.000	36 -12 66
						0.000	0.000	7.26	6.56	0.000	16 -88 -2
						0.000	0.001	56	0.000	0.000	-52 -28 16
						0.000	0.001	46	0.001	0.000	62 -2 42
						0.000	0.000	163	0.000	0.001	-62 8 26
								6.46	5.94	0.000	-58 -2 38
								5.97	5.55	0.000	-58 -8 44
						0.001	0.021	21	0.014	0.002	64 -14 24
						0.003	0.063	12	0.052	0.003	8 -72 -12
						0.000	0.006	32	0.003	0.005	18 -62 -48
								5.21	5.00	0.000	14 -64 -56

table shows 3 local maxima more than 8.0mm apart

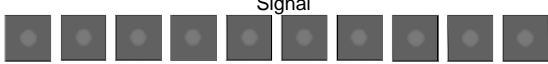
Height threshold: T = 5.12, p = 0.000 (0.050) Degrees of freedom = [10, 112.0]
 Extent threshold: k = 0 voxels, p = 1.000 (0.050) FWHM = 10.0 9.9 9.9 mm mm mm, 5.0 4.9 4.9 (voxels)
 Expected voxels per cluster, λ = 3.126 Volume: 1903512 = 237939 voxels = 1832.0 resels
 Expected number of clusters, λ_c = 0.05 Voxel size: 2.0 2.0 2.0 mm mm mm, (resel = 121.32 voxels)
 FWEp: 5.116, FDRp: 6.263, FWEc: 1, FDRc: 21 Page 1

Inference for Images

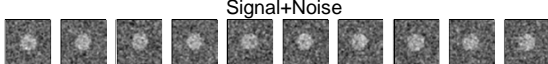
Noise



Signal

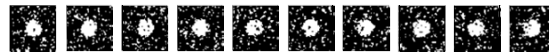


Signal+Noise



Penny

Use of 'uncorrected' p-value, $\alpha=0.1$



11.3% 11.3% 12.5% 10.8% 11.5% 10.0% 10.7% 11.2% 10.2% 9.5%
Percentage of Null Pixels that are False Positives

Using an 'uncorrected' p-value of 0.1 will lead us to conclude on average that 10% of voxels are active when they are not.

To correct for this we can define a null hypothesis for images of statistics.

Penny

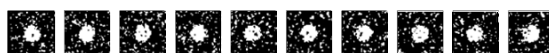
Statistics: p-values adjusted for search volume

set-level		cluster-level				peak-level				mm mm mm			
ρ	c	$\rho_{\text{FDR}}^{\text{cluster}}$	$q_{\text{FDR}}^{\text{cluster}}$	k_E	ρ_{uncorr}	$\rho_{\text{FDR}}^{\text{peak}}$	$q_{\text{FDR}}^{\text{peak}}$	T	(Z_p)	ρ_{uncorr}			
0.00017	0.000	0.000	0.000	751	0.000	0.000	13.90	Inf	0.000	0.000	18	-52	-24
					0.007	0.171	5.63	5.28	0.000	0.000	6	-62	-12
		0.000	0.000	2145	0.000	0.000	13.02	Inf	0.000	0.000	-40	-10	60
					0.000	0.000	12.62	Inf	0.000	0.000	-32	-14	70
		0.000	0.000	159	0.000	0.000	9.09	7.84	0.000	0.000	64	8	18
		0.000	0.000	165	0.000	0.000	7.88	7.01	0.000	0.000	2	-6	60
		0.000	0.000	170	0.000	0.000	7.62	6.82	0.000	0.000	36	-12	66
		0.000	0.000	91	0.000	0.000	7.26	6.56	0.000	0.000	16	-88	-2
		0.000	0.001	56	0.000	0.000	7.13	6.46	0.000	0.000	-52	-28	18
		0.000	0.001	46	0.001	0.000	7.07	6.42	0.000	0.000	62	-2	42
		0.000	0.000	163	0.000	0.001	6.95	6.32	0.000	0.000	-62	8	26
					0.000	0.007	6.46	5.94	0.000	0.000	-58	-2	38
					0.002	0.054	5.97	5.55	0.000	0.000	-58	-8	44
		0.001	0.021	21	0.014	0.002	0.070	5.90	5.49	0.000	64	-14	24
		0.003	0.063	12	0.052	0.003	0.089	5.83	5.43	0.000	8	-72	-12
		0.000	0.006	32	0.003	0.005	0.124	5.73	5.36	0.000	18	-62	-48
					0.025	0.517	5.31	5.00	0.000	0.000	14	-64	-56


table shows 3 local maxima more than 6.0mm apart

Height threshold: $T = 5.12, p = 0.000 (0.050)$ Degrees of freedom = $[1, 0, 112, 0]$
 Extent threshold: $k = 0$ voxels, $p = 1.000 (0.050)$ FWHM = $10.0 \times 9.9 \times 8$ mm mm mm; $5.0 \times 4.9 \times 4.9$ (voxels)
 Expected voxels per cluster, $\langle v \rangle = 3.126$ Volume: $1903512 = 237939$ voxels = 1832.0 resels
 Expected number of clusters, $\langle c \rangle = 0.05$ Voxel size: $2.0 \times 2.0 \times 2.0$ mm mm mm; (resel = 121.52 voxels)
 FWE: 5.116, FDR: 6.263, FWE: 1, FDR: 21
 Page 1

Use of 'uncorrected' p-value, $\alpha=0.1$



Use of 'corrected' p-value, $\alpha=0.1$



FWE

Penny

Statistics: p-values adjusted for search volume

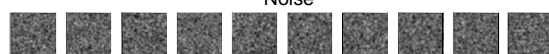
set-level		cluster-level				peak-level				mm mm mm			
ρ	c	$\rho_{\text{FDR}}^{\text{cluster}}$	$q_{\text{FDR}}^{\text{cluster}}$	k_E	ρ_{uncorr}	$\rho_{\text{FDR}}^{\text{peak}}$	$q_{\text{FDR}}^{\text{peak}}$	T	(Z_p)	ρ_{uncorr}			
0.00017	0.000	0.000	0.000	751	0.000	0.000	13.90	Inf	0.000	0.000	18	-52	-24
					0.007	0.171	5.63	5.28	0.000	0.000	6	-62	-12
		0.000	0.000	2145	0.000	0.000	13.02	Inf	0.000	0.000	-40	-10	60
					0.000	0.000	12.62	Inf	0.000	0.000	-32	-14	70
		0.000	0.000	159	0.000	0.000	9.09	7.84	0.000	0.000	64	8	18
		0.000	0.000	165	0.000	0.000	7.88	7.01	0.000	0.000	2	-6	60
		0.000	0.000	170	0.000	0.000	7.62	6.82	0.000	0.000	36	-12	66
		0.000	0.000	91	0.000	0.000	7.26	6.56	0.000	0.000	16	-88	-2
		0.000	0.001	56	0.000	0.000	7.13	6.46	0.000	0.000	-52	-28	18
		0.000	0.001	46	0.001	0.000	7.07	6.42	0.000	0.000	62	-2	42
		0.000	0.000	163	0.000	0.001	6.95	6.32	0.000	0.000	-62	8	26
					0.000	0.007	6.46	5.94	0.000	0.000	-58	-2	38
					0.002	0.054	5.97	5.55	0.000	0.000	-58	-8	44
		0.001	0.021	21	0.014	0.002	0.070	5.90	5.49	0.000	64	-14	24
		0.003	0.063	12	0.052	0.003	0.089	5.83	5.43	0.000	8	-72	-12
		0.000	0.006	32	0.003	0.005	0.124	5.73	5.36	0.000	18	-62	-48
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table shows 3 local maxima more than 6.0mm apart


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 Expected voxels per cluster, $\langle v \rangle = 3.126$ Volume: $1903512 = 237939$ voxels = 1832.0 resels
 Expected number of clusters, $\langle c \rangle = 0.05$ Voxel size: $2.0 \times 2.0 \times 2.0$ mm mm mm; (resel = 121.52 voxels)
 FWE: 5.116, FDR: 6.263, FWE: 1, FDR: 21
 Page 1

False Discovery Rate

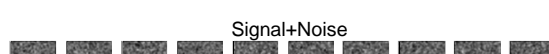
Noise



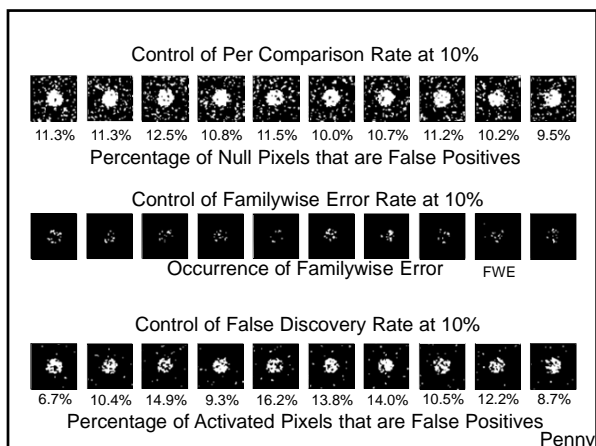
Signal



Signal+Noise



Penny

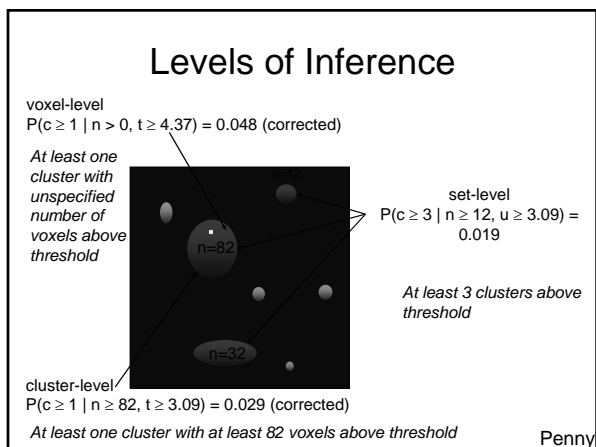


Statistics: p-values adjusted for search volume

set-level		cluster-level				peak-level				mm mm mm	
p	c	\hat{P}_{FDR}	\hat{Q}_{FDR}	k_E	\hat{P}_{uncorr}	\hat{P}_{FDR}	\hat{Q}_{FDR}	T	(Z _p)	\hat{P}_{uncorr}	
0.00017	0.000	0.000	0.000	751	0.000	0.000	0.000	13.90	Inf	0.000	18 -52 -24
						0.007	0.171	5.62	5.28	0.000	6 -62 -12
				2145	0.000	0.000	0.000	13.02	Inf	0.000	-40 -10 60
						0.000	0.000	12.62	Inf	0.000	-22 -14 70
						0.000	0.000	12.56	Inf	0.000	-26 -20 54
				159	0.000	0.000	0.000	9.09	7.84	0.000	64 8 18
				165	0.000	0.000	0.000	7.88	7.01	0.000	2 -6 60
				170	0.000	0.000	0.000	7.62	6.82	0.000	36 -12 66
				91	0.000	0.000	0.000	7.26	6.56	0.000	16 -88 -2
				56	0.000	0.000	0.000	7.13	6.46	0.000	-52 -28 18
				46	0.001	0.001	0.000	7.07	6.42	0.000	62 -2 42
				163	0.000	0.001	0.000	6.95	6.32	0.000	-62 8 26
					0.000	0.007	0.000	6.46	5.94	0.000	-58 -2 38
					0.002	0.054	0.000	5.97	5.55	0.000	-8 -44
				21	0.014	0.002	0.070	5.90	5.49	0.000	64 -14 24
				12	0.052	0.003	0.089	5.83	5.43	0.000	8 -72 -12
				32	0.003	0.005	0.124	5.73	5.36	0.000	18 -62 -48
					0.025	0.517	0.000	5.21	5.00	0.000	14 -64 -56

table shows 3 local maxima more than 8.0mm apart

Height threshold: T = 5.12, p = 0.000 (0.050) Degrees of freedom = [1.0, 112.0]
 Extent threshold: k = 0 voxels, p = 1.000 (0.050) FWHM = 10.0 9.9 9.8 mm mm mm, 5.0 4.9 4.9 (voxels)
 Expected voxels per cluster, $\leq c = 3.126$ Volume: 1903512 = 237939 voxels = 1832.0 resels
 Expected number of clusters, $\leq c = 0.05$ Voxel size: 2.0 2.0 2.0 mm mm mm, (resel = 121.32 voxels)
 FWEp: 5.116, FDRp: 6.263, FWEc: 1, FDRc: 21 Page 1



Statistics: p-values adjusted for search volume

set-level		cluster-level				peak-level				mm mm mm	
p	c	\hat{P}_{FDR}	\hat{Q}_{FDR}	k_E	\hat{P}_{uncorr}	\hat{P}_{FDR}	\hat{Q}_{FDR}	T	(Z _p)	\hat{P}_{uncorr}	
0.00017	0.000	0.000	0.000	751	0.000	0.000	0.000	13.90	Inf	0.000	18 -52 -24
						0.007	0.171	5.62	5.28	0.000	6 -62 -12
				214	0.000	0.000	0.000	13.02	Inf	0.000	-40 -10 60
						0.000	0.000	12.62	Inf	0.000	-22 -14 70
						0.000	0.000	12.56	Inf	0.000	-26 -20 54
				159	0.000	0.000	0.000	9.09	7.84	0.000	64 8 18
				165	0.000	0.000	0.000	7.88	7.01	0.000	2 -6 60
				170	0.000	0.000	0.000	7.62	6.82	0.000	36 -12 66
				91	0.000	0.000	0.000	7.26	6.56	0.000	16 -88 -2
				56	0.000	0.000	0.000	7.13	6.46	0.000	-52 -28 18
				46	0.001	0.001	0.000	7.07	6.42	0.000	62 -2 42
				163	0.000	0.001	0.000	6.95	6.32	0.000	-62 8 26
					0.000	0.007	0.000	6.46	5.94	0.000	-58 -2 38
					0.002	0.054	0.000	5.97	5.55	0.000	-8 -44
				21	0.014	0.002	0.070	5.90	5.49	0.000	64 -14 24
				12	0.052	0.003	0.089	5.83	5.43	0.000	8 -72 -12
				32	0.003	0.005	0.124	5.73	5.36	0.000	18 -62 -48
					0.025	0.517	0.000	5.21	5.00	0.000	14 -64 -56

table shows 3 local maxima more than 8.0mm apart

Height threshold: T = 5.12, p = 0.000 (0.050) Degrees of freedom = [1.0, 112.0]
 Extent threshold: k = 0 voxels, p = 1.000 (0.050) FWHM = 10.0 9.9 9.8 mm mm mm, 5.0 4.9 4.9 (voxels)
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 Expected number of clusters, $\leq c = 0.05$ Voxel size: 2.0 2.0 2.0 mm mm mm, (resel = 121.32 voxels)
 FWEp: 5.116, FDRp: 6.263, FWEc: 1, FDRc: 21 Page 1

Statistics: p-values adjusted for search volume

set-level		cluster-level				peak-level				mm mm mm	
p	c	\hat{P}_{FDR}	\hat{Q}_{FDR}	k_E	\hat{P}_{uncorr}	\hat{P}_{FDR}	\hat{Q}_{FDR}	T	(Z _p)	\hat{P}_{uncorr}	
0.00017	0.000	0.000	0.000	751	0.000	0.000	0.000	13.90	Inf	0.000	18 -52 -24
						0.007	0.171	5.62	5.28	0.000	6 -62 -12
				2145	0.000	0.000	0.000	13.02	Inf	0.000	-40 -10 60
						0.000	0.000	12.62	Inf	0.000	-22 -14 70
						0.000	0.000	12.56	Inf	0.000	-26 -20 54
				159	0.000	0.000	0.000	9.09	7.84	0.000	64 8 18
				165	0.000	0.000	0.000	7.88	7.01	0.000	2 -6 60
				170	0.000	0.000	0.000	7.62	6.82	0.000	36 -12 66
				91	0.000	0.000	0.000	7.26	6.56	0.000	16 -88 -2
				56	0.000	0.000	0.000	7.13	6.46	0.000	-52 -28 18
				46	0.001	0.001	0.000	7.07	6.42	0.000	62 -2 42
				163	0.000	0.001	0.000	6.95	6.32	0.000	-62 8 26
					0.000	0.007	0.000	6.46	5.94	0.000	-58 -2 38
					0.002	0.054	0.000	5.97	5.55	0.000	-8 -44
				21	0.014	0.002	0.070	5.90	5.49	0.000	64 -14 24
				12	0.052	0.003	0.089	5.83	5.43	0.000	8 -72 -12
				32	0.003	0.005	0.124	5.73	5.36	0.000	18 -62 -48
					0.025	0.517	0.000	5.21	5.00	0.000	14 -64 -56

table shows 3 local maxima more than 8.0mm apart

Height threshold: T = 5.12, p = 0.000 (0.050) Degrees of freedom = [1.0, 112.0]
 Extent threshold: k = 0 voxels, p = 1.000 (0.050) FWHM = 10.0 9.9 9.8 mm mm mm, 5.0 4.9 4.9 (voxels)
 Expected voxels per cluster, $\leq c = 3.126$ Volume: 1903512 = 237939 voxels = 1832.0 resels
 Expected number of clusters, $\leq c = 0.05$ Voxel size: 2.0 2.0 2.0 mm mm mm, (resel = 121.32 voxels)
 FWEp: 5.116, FDRp: 6.263, FWEc: 1, FDRc: 21 Page 1

