Simulation data

The data from all 28 simulations is saved in MATLAB format. The variables are:

- *Nsubjects* is the number of "subjects" in the simulation.
- *Ntimepoints* is the number of timepoints for each subject.
- *Nnodes* is the number of nodes in the network.
- *ts* contains all subjects' timeseries concatenated. Please note that all methods only ever process one "subject" at a time, in order to evaluate on realistic session durations, and then characterise variability by comparing results across subjects. There are *Nnodes* columns, one for each network node. Each vertical chunk of *Ntimepoints* X *Nnodes* is a different subject's dataset.
- *net* contains the ground truth networks (dimensions *Nsubjects* X *Nnodes* X *Nnodes*), which in general are slightly different for each of the subjects.

Simulation summary

Simulation	Number of Nodes	Session time	TR	noise	HRFstd	Additional effects
1	5	10 min	3.00s	1.00%	0.5s	
2	10	10 min	3.00s	1.00%	0.5s	
3	15	10 min	3.00s	1.00%	0.5s	
4	50	10 min	3.00s	1.00%	0.5s	
5	5	60 min	3.00s	1.00%	0.5s	
6	10	60 min	3.00s	1.00%	0.5s	
7	5	250 min	3.00s	1.00%	0.5s	
8	5	10 min	3.00s	1.00%	0.5s	shared inputs
9	5	250 min	3.00s	1.00%	0.5s	shared inputs
10	5	10 min	3.00s	1.00%	0.5s	global mean confound
11	10	10 min	3.00s	1.00%	0.5s	bad ROIs (timeseries mixed with each other)
12	10	10 min	3.00s	1.00%	0.5s	bad ROIs (new random timeseries mixed in)
13	5	10 min	3.00s	1.00%	0.5s	backwards connections
14	5	10 min	3.00s	1.00%	0.5s	cyclic connections
15	5	10 min	3.00s	0.10%	0.5s	stronger connections
16	5	10 min	3.00s	1.00%	0.5s	more connections
17	10	10 min	3.00s	0.10%	0.5s	
18	5	10 min	3.00s	0.10%	0.0s	
19	5	10 min	0.25s	0.10%	0.5s	neural lag = 100ms
20	5	10 min	0.25s	0.10%	0.0s	neural lag = 100ms
21						Two-group t-test on estimated connection strengths
22	5	10 min	3.00s	0.10%	0.5s	nonstationary connections strengths
23	5	10 min	3.00s	0.10%	0.5s	stationary connection strengths
24	5	10 min	3.00s	0.10%	0.5s	only one strong external input
25	5	5 min	3.00s	1.00%	0.5s	
26	5	2.5 min	3.00s	1.00%	0.5s	
27	5	2.5 min	3.00s	0.10%	0.5s	
28	5	5 min	3.00s	0.10%	0.5s	

Example MATLAB code

To view the mean (across 50 "subjects") ground truth network:
```
imagesc(squeeze(mean(net)));
```

To get the matrix of all nodes' timeseries for just the first subject:
```
ts1=ts(1:Ntimepoints,:);
```

To see the (full, normalised) correlation matrix for just the first subject:
```
imagesc(corrcoef(ts1))
```

To get the partial correlation matrix for just the first subject:
```
ic=-inv(cov(ts1)); % raw negative inverse covariance matrix
r=(ic ./ repmat(sqrt(abs(diag(ic))),1,Nnodes)) ./
repmat(sqrt(abs(diag(ic)))',Nnodes,1); % use diagonal to get normalised
coefficients
r=r+eye(Nnodes); % remove diagonal
```

To run ICOV and convert to normalised coefficients, first grab the L1precision code (available at **/scratch/braindata/shared/netsim_data_(smith)/**) and then::
```
lambda=5; % arbitrary choice of regularisation!
oc=cov(ts1); % raw covariance
ic=-L1precisionBCD(oc/mean(diag(oc)),lambda/1000); % get regularised negative
inverse covariance
r=(ic ./ repmat(sqrt(abs(diag(ic))),1,Nnodes)) ./
repmat(sqrt(abs(diag(ic)))',Nnodes,1); % use diagonal to get normalised
coefficients
r=r+eye(Nnodes); % remove diagonal
```