

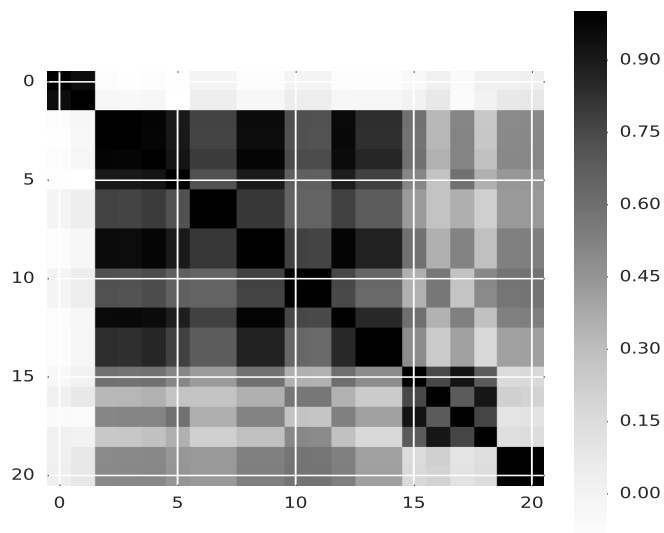


# NeuroDesign: optimisation report

Document created: Tue Jan 24 23:16:04 2017

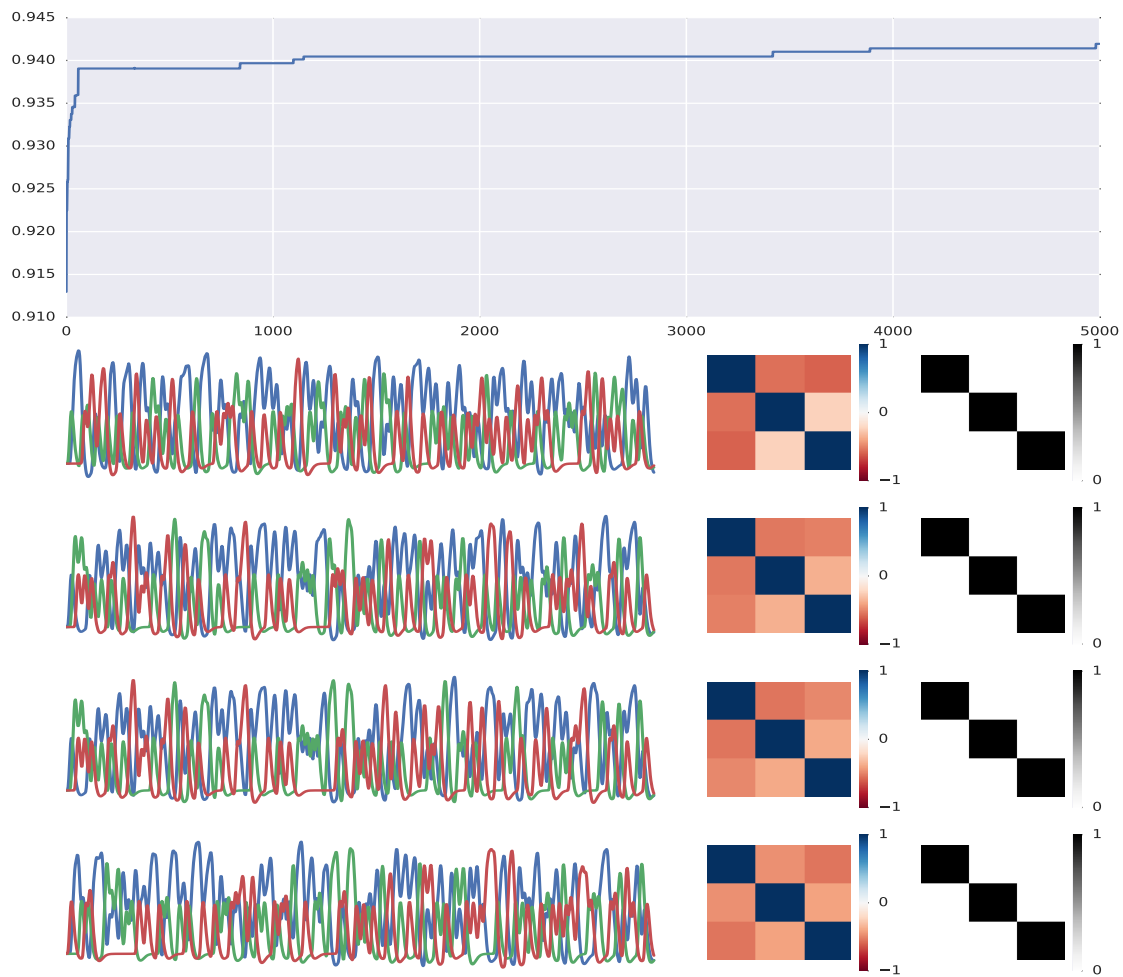
## Correlation between designs

During the optimisation, the designs are mixed with each other to find better combinations. As such, the designs can look very similar. Actually, the genetic algorithm uses natural selection as a basis, and as such, the designs can be clustered in families. This is the covariance matrix between the final 20 designs



## Selected designs

The following figure shows in the upper panel the optimisation score over the different generations. Below are the expected signals of the best designs from different families, more specific and in relation with the covariance matrix, designs 0, 2, 15, 19. Next to each design is the covariance matrix between the regressors, and the diagonal matrix with the eigenvalues of the design matrix.



## Experimental settings

|                                       |                               |
|---------------------------------------|-------------------------------|
| Repetition time (TR):                 | 0.68                          |
| Number of trials:                     | 240                           |
| Number of scans:                      | 971                           |
| Number of different stimuli:          | 3                             |
| Stimulus probabilities:               | 0.5 0.25 0.25                 |
| Duration of stimulus (s)              | 1.5                           |
| Seconds before stimulus (in trial):   | 0.0                           |
| Seconds after stimulus (in trial)     | 1                             |
| Duration of trial (s):                | 2.5                           |
| Total experiment duration(s):         | 660                           |
| Number of stimuli between rest blocks | 0                             |
| Duration of rest blocks (s):          | 0.0                           |
| Contrasts:                            | 0.5 -0.25 -0.25<br>0 0.5 -0.5 |
| ITI model:                            | exponential                   |
| minimum ITI:                          | 0.0                           |
| mean ITI:                             | 0.25                          |
| maximum ITI:                          | 10.0                          |
| Hard probabilities:                   | False                         |
| Maximum number of repeated stimuli:   | 6                             |
| Resolution of design:                 | 0.1                           |
| Assumed autocorrelation:              | 0.3                           |

## Optimalisation settings

|  |                 |
|--|-----------------|
| Optimalisation weights (Fe,Fd,Fc,Ff):    | 0.0 0.1 0.4 0.5 |
| Aoptimality?                             | True            |
| Number of designs in each generation:    | 20              |
| Number of immigrants in each generation: | 4               |
| Confounding order:                       | 3               |
| Convergence criterion:                   | 1000            |
| Number of precycles:                     | 2000            |
| Number of cycles:                        | 5000            |
| Percentage of mutations:                 | 0.01            |
| Seed:                                    | 2081948676      |