Script to plot Figure 4ab

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Winawer, Kay, Foster, Parvizi, Wandell. **Asynchronous broadband signals are the principal source of the BOLD response in human visual cortex** *Current Biology, 2013*

This figure compares the prf model accuracy for a linear fit and a CSS fit, for both the asynchronous broadband (panel a) and stimulus locked stimulus-locked (pabel b) time series.

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A note on reproducibility: The plots produced from this script differ very slightly from the plots in Figure 4 in the publication. This is due to a slight difference in the stimulus descriptions used for solving the pRF models. In this script, the stimuli used as inputs for the pRF models are binary masks. For the publication the stimuli were floats approximating a binary mask, with occasional pixel values differing slightly from 0 or 1 due to an imperfection in the algorithm that converted the image indices used for the experiments into into binary contrast masks.

Set up paths

```
% Path to save the eps figures
savepth   = fullfile(ecogPRFrootPath, 'scratch');
```

Load the PRF model solutions

The pRF models are pre-solved. If you would like to resolve them, run the following script:

```
s_ecogSolvePRFs
```

```
% Load the precomputed AB and SL pRF model solutions. This includes the CSS
% model ('exp') and the linear model ('noexp') for each component of the
% ECoG signal.
prf.abExp   = load(fullfile(ecogPRFrootPath, 'data', 'PRF_xval_exp_ab'));
prf.abNoExp = load(fullfile(ecogPRFrootPath, 'data', 'PRF_xval_noexp_ab'));
prf.slExp   = load(fullfile(ecogPRFrootPath, 'data', 'PRF_xval_exp_sl'));
prf.slNoExp = load(fullfile(ecogPRFrootPath, 'data', 'PRF_xval_noexp_sl'));
```

Select appropriate channels

For summarizing population data, we impose the following selection criterion:

1. Variance explained from either the exp or noexp model exceeds 20%

2. This is determined separately for the AB and SL data sets

For further details, see supplementary table 1 and supplementary methods section 'Channel Selection'.

```
abok = prf.abExp.params.r > 20 | prf.abNoExp.params.r > 20;
slok = prf.slExp.params.r > 20 | prf.slNoExp.params.r > 20;
```

Figure 4a: Scatterplot of AB variance explained, CSS versus Linear models

```
fH = figure;set(fH, 'Color', 'w');
set(gca, 'FontSize', 16, 'XLim' ,[0 100], 'YLim', [0 100]); axis square
hold on;

title('Cross-validated variance explained, Asynchronous Broadband')
xlabel('Linear model')
ylabel('CSS model')

colors = 'rgbw';

for subj = 1:4

    % Plot V1V2V3 channels as filled circles. Rectify (ie, negative r becomes
    % 0, otherwise we lose points on the plots)
    toPlot = abok & prf.abExp.params.subj == subj & prf.abExp.params.isV1V2V3;
    x = max(prf.abNoExp.params.r(toPlot), 0);
    y = max(prf.abExp.params.r(toPlot), 0);
    plot(x,y, 'ko', 'MarkerFaceColor', colors(subj), 'MarkerSize', 12);


    % Plot channels outside V!V2V3 as filled diamonds
    toPlot = abok & prf.abExp.params.subj == subj & ~prf.abExp.params.isV1V2V3;
    x = max(prf.abNoExp.params.r(toPlot), 0);
    y = max(prf.abExp.params.r(toPlot), 0);
    plot(x,y, 'kd', 'MarkerFaceColor', colors(subj), 'MarkerSize', 12);

end

% Plot the identity line
plot([0 100], [0 100], 'k-')
```

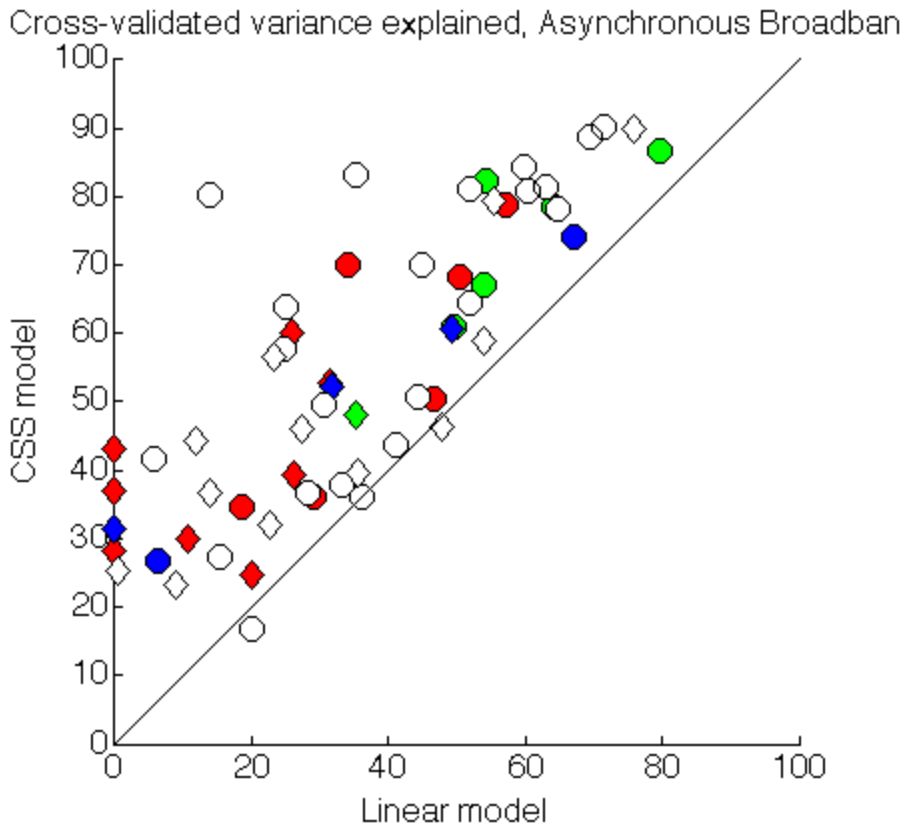
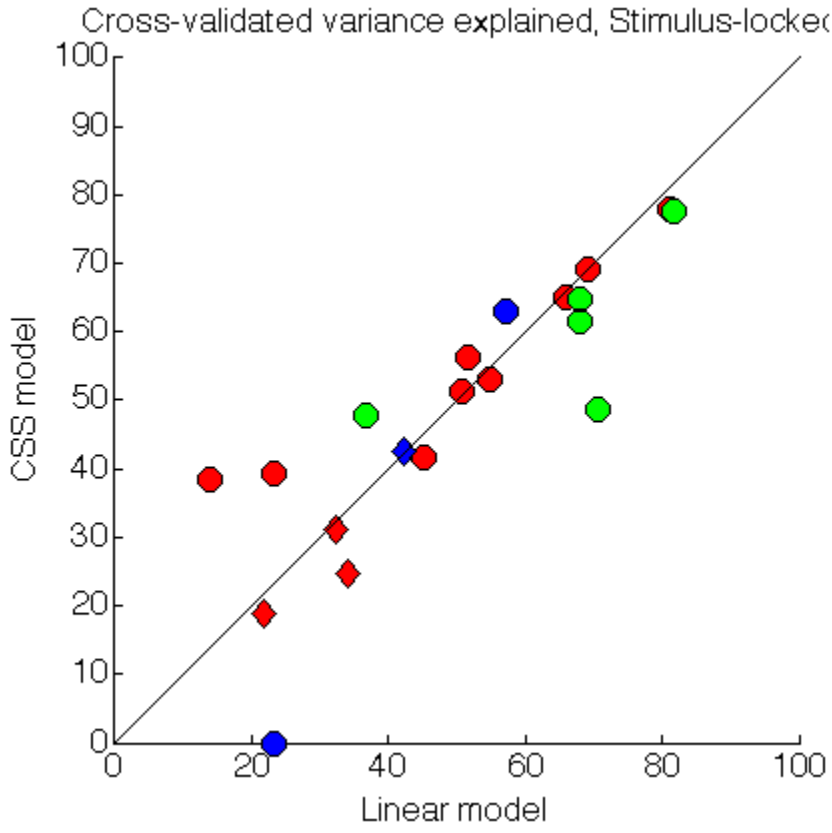


Figure 4b: Scatterplot of SL variance explained, CSS versus Linear models

```
fH(2) = figure;set(fH, 'Color', 'w');
set(gca, 'FontSize', 16, 'XLim' ,[0 100], 'YLim', [0 100]); axis square
hold on;

title('Cross-validated variance explained, Stimulus-locked')
xlabel('Linear model')
ylabel('CSS model')

colors = 'rgbw';

for subj = 1:4

    % Plot V1V2V3 channels as filled circles. Rectify (ie, negative r becomes
    % 0, otherwise we lose points on the plots)
    toPlot = slok & prf.slExp.params.subj == subj & prf.slExp.params.isV1V2V3;
    x = max(prf.slNoExp.params.r(toPlot), 0);
    y = max(prf.slExp.params.r(toPlot), 0);
    plot(x,y, 'ko', 'MarkerFaceColor', colors(subj), 'MarkerSize', 12);


    % Plot channels outside V!V2V3 as filled diamonds
```

```
        toPlot = slok & prf.slExp.params.subj == subj & ~prf.slExp.params.isV1V2V3;
        x = max(prf.slNoExp.params.r(toPlot), 0);
        y = max(prf.slExp.params.r(toPlot), 0);
        plot(x,y, 'kd', 'MarkerFaceColor', colors(subj), 'MarkerSize', 12);

    end

    % Plot the identity line
    plot([0 100], [0 100], 'k-')


    % %% Save 'em
    %
    % hgexport(fH(1), fullfile(savepth, 'Figure4a_AB_pRF_Accuracy.eps'));
    % hgexport(fH(2), fullfile(savepth, 'Figure4b_SL_pRF_Accuracy.eps'));
    %
    % return
```



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