# Code structure

## Think through interaction of PCA, decoding paint versus shadow, etc. At the moment it has gotten a bit crufty.

## Modular code for naming output directories and figure titles. Currently done in too many places

## Think of a clean way to combine analyses across measurement sessions.

# Little cluster things

## Get git/svn repositories properly installed on rhino.

## Make sure startup bug is fixed.

## Try speeding up ssh using Gavin’s config file.

# Figure related

## ~~Get LaTex code working again~~ (But will need to update dir names as we rerun shuffle analyses with new scheme.)

## ~~Example figure for physiology should be in lower visual field.~~

## ~~Figure look for VSS talk~~

## ~~Make font/point sizes and labels come out right without need to fuss~~.

## ~~Automate production of figures that go into the talk~~

## Some of the thin lines didn’t show up in PowerPoint very well

## Different symbol for ST in summary plots, with color matched for V1

## Improve my slide for explaining how we get the inferred matches from the decoding -- there were a lot of puzzled looks in the room when I did that, even though it seemed obvious to me.  This is mainly a question of unpacking it step by step.  ~~Also, the diagonal unity lines in those plots are too faint on the projected image, need to fix those up.~~

# Analysis

## Better automated transfer of psychophysics summary measures into population decoding programs (currently done by hand.

## Analyze new paint/shadow image data.

## Pool all multiunits across sessions and make it so we can look at that in interesting ways.

## Fit RF data for each good multiunit to obtain center x,y, and RF size summary. This may require some way to screen for units where the data are not good enough to get a sensible answer.

## See if we can classify paint versus shadow.

### Try analyzing blank trials to see if its easy with those.

## Use single multiunit decoding range as a proxy for electrode weight and examine how this property varies with RF position etc.

## Develop a way to decide whether each multiunit codes probe luminance and whether this coding is different for paint versus shadow. And similarly whether the unit responds differently to the paint versus shadow blanks.

### Some sort of of ANOVA/regression could be used to do this.

### Examine whether these properties vary with RF position and betwee n V1/V4

## Look at decoding weights of individual units and try to understand how they vary with RF properties.

### Identifiability issues. Can we quantify them? Maybe look at how stable weights are with LOO regressions?  Or in some other fashion.

### An alternative approach might be to turn it around and look at how decoding changes if we remove neurons whose RFs are progressively more distant from the probe.

### Might use RF locations to select neurons that aren't near the probe or that are near the paint/shadow boundary and see whether we can classify paint/shadow based on those.

### PCA idea in this context.  Worry about LOO and PCA.

## Some sort of analysis to find out/verify the V1/V4 differences aren't due to some simple unit sampling differences.

## How do slopes of the psychometric functions (aka thresholds) vary or don't with paint/shadow.

## Sliding window on time for psth’s, and see how decoding performance varies with time and whether this differs between V1 and V4.

## Try lasso (sparse) regression and/or svn regression. The latter is supposed to be better in an LOO way than regular old regression, according to Kamesh.

# Talk

## The fact that the luminance decoding wasn't linear in luminance generated some discussion.  Would be nice to be more articulate about why this isn't surprising and why we shouldn't be more worried about it.

### Can mention that perception of lightness isn't linear in luminance and that discrimination varies with the luminance of the pedestal around which it is measured.

### Some people thought that some sort of non-linear regression could changes this.  I encouraged them to come talk to me and tell me how to do it.

### Someone thought there was a way to get insight out of the detailed behavior of an SVM classifier or regression.  I also encouraged him to come by and educate me.

### Instead of trying to decode luminance, try to decode surface reflectance.  I think we can do this, because I actually built the stimuli via a (very simple) simulation of illumination reflecting from surfaces.  The idea here was that if the visual system is trying to represent reflectance, perhaps the decoding would work more effective in that domain.  [My intuition is that this won't add too much, but I think it is worth pondering and trying.]S

### See if one can express the intercept in terms of lightness constancy.  About how much lightness constancy does it represent.

### People seemed a bit surprised by my statement that the best one or two neurons couldn't decode very effectively.  I didn't have slides to show for that, but it is what we found.  Making sure this makes sense in terms of the info carried in single units might be good.

## The talk needed to be a bit more explicit about the driving logic that we are interested in what is 'explicity' represented in the population responses, as measured by a simple luminance decoder.  I found this hard to convey clearly.  And with it the idea that we don't believe there is stimulus information in V4 that isn't in V1.

### There was quite a bit of interest in how well we can classify paint versus shadow, and in general obtaining some sort of measure of the information that is in each area if we decode/classify in more general ways.

## Electrodes in dorsal or ventral V4?

## What is physiology monitor max luminance?

# Minor

### Worry about the fact that a difference between paint and shadow is that the central square makes a clear edge with its surround in the paint condition but not in the shadow condition. [I am not sure this is critical with respect to our logic even if it matters.  But, the new paint/shadow images would not have this feature to the same degree.]  The discussion of this point also led to a question as to whether the illusion would persist for checkerboards with blurry images.]